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ABSTRACT

Presented are 19 research reports which apply the philosophy of the consulting teacher program at the University of Vermont to provide special education individualized services within regular classrooms for Junior and Senior High School Students with academic and behavioral problems. Included are an overview of the consulting teacher program and a summary of the secondary special education project for school years 1972 and 1973, which emphasize the role of the consulting teacher in the training of the regular class teacher to work with exceptional secondary school students. The research projects, which were conducted in three Vermont school districts, focus on the use of behavior modification, contingency contracting, and token economies for remediation in areas such as language arts, mathematics, reading, self discipline, and study behavior. Research titles include: "Teaching Self Discipline Through Contingency Contracting," "A Multiple Baseline Analysis Of A Token System On Reading Comprehension," and "Increasing The Arithmetic Performance Of Two Ninth Grade Students Using Teacher Praise and Immediate Knowledge Of Results." (BA)

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INDIVIDUALIZING JUNIOR AND SENIOR HIGH SCHOOL INSTRUCTION TO PROVIDE SPECIAL EDUCATION WITHIN REGULAR CLASSROOMS:

The 1972-1973 Research Service Reports of the Secondary Special Education Project

Edited by Ann Egner

A cooperative effort of the Special Education Program of the College of Education, University of Vermont; the Division of Special Education and Pupil Personnel Services of the Vermont State Department of Education; the Bureau of Education for the Handicapped, U.S. Office of Education; and the Burlington, Chittenden Central and Chittenden South school districts.

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A Consulting Teacher Approach to Accelerate the Progress of Exceptional Adolescents

by

Phyllis Paolucci, Joe Abruscato, Margritte Graves, and Ann Egner

The consulting teacher approach is a training based model whereby regular class teachers are trained to provide special educational services directly to their students. The rationale for this approach (McKenzie, Egner, Knight, Perelman, Schneider, and Garvin, 1970; McKenzie, 1972; Fox, Egner, Paolucci, Perelman McKenzie, and Garvin, 1973) has been supported by Lilly (1971), Martin (1972) and Deno (1973). Some of the specific reasons listed by McKenzie (1972) include:

1. Avoidance of stigma and labels (recent court decisions support the ethical right of every citizen to a normal education).
2. Avoidance of discrimination and segregation.
3. Opportunities for normal and handicapped students to learn to better understand and help each other.
4. Training of regular teachers in special education skills.
5. Avoidance of extensive busing to regional classes.
6. Avoidance of disruption to students, parents and schools.
7. Savings of financial resources (It is estimated that 80% of the students eligible for special education in Vermont are in regular classes; the consulting teacher approach costs $200 less per student per year than the special class approach).

The basic assumptions of Secondary Special Education Project include:

1. A large number of junior and senior high school students eligible for special education can be effectively and humanely educated in regular classes.

2. Students with severe academic and social discrepancies can learn when provided with a responsive learning environment.

3. Junior and senior high school teachers can, with support and training, develop instructional strategies that will provide a responsive teaching/learning environment for students eligible for special services which costs less than a special class approach.

4. An effective response to the needs of secondary students, their teachers and parents will require a model that includes a school-based consultant.

Under the training-based model provided by the consulting teacher approach, there are only two kinds of students those achieving minimum objectives and those who require special services so that they too will be able to achieve at the minimum expected level of their peers. Minimum objectives are those behaviors defined by a community as the essential skills and knowledge which all student's in their school must possess at any specific time in their education. These objectives must specify behaviors which will result from instruction, the conditions under which the behaviors will occur, and the criteria establishing levels at which the behaviors are judged to be acceptable. An additional specification is a time limitation in which these objectives must be achieved. For example

Given nine years of instruction in math, at the ABC School District	all students will compute the answers to the 40 minimum required math problems	within 40 minutes with 90-100% accuracy.

When students do not perform at the minimum level, this signals the teachers that special services are required. Special services mean adding to, or rearranging the teaching/learning environment until the student's rate of acquiring the necessary behaviors is accelerated such that he achieves at the specified level.

Consulting teachers are experienced classroom teachers who have participated in a rigorous M.Ed. program which enabled them to become learning specialists in the areas of individualized instruction, analysis of behavior, research and consultation. Their training begins during the summer session and continues at the University of Vermont during the next year. Following the completion of the intensive summer and first year study, the consulting teacher-in-training must serve a one year's internship in a Vermont school district. After the completion of all training objectives, which include demonstrated service to at least 32 eligible students, the consulting teacher intern must present his credentials to the Board of Consulting Teacher Examiners to obtain recommendation for state certification.

Consulting teachers teach regular teachers special education skills through consultation, workshops, and formal course work (Christie, McKenzie and Burdett, 1972). The general goal of these training programs is to bring the teacher under the control of the learner's behaviors. The teacher begins to make educational

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decisions based on reliably measured changes in the learner's performance rather than on inferred mental or emotional states.

The behavioral model of education proposed by McKenzie (1972) describes the learner as an individual in relation to the acquisition and maintenance of a set of minimum basic skills, knowledge, and attitudes required to successfully function in today's society. This model includes four components: 1) specification of the minimum set of critical objectives; 2) determination of the learner's current repertoire or level of performance in relation to the objectives; 3) delineation of the teaching/learning procedures required to help the learner reach these objectives; and 4) evaluation of the procedures in terms of the learner's reliably measured progress. Under this model, the teacher analyzes each student as an individual. The learner's current responses determine which antecedent stimuli occasion classroom behaviors and which consequential stimuli act as punishers and reinforcers. Special education programs would then be any changes in assignments or learning materials (antecedent events), criteria for acceptable performance (learner's responses), and rewards and punishment (consequent events) which result in accelerating the learner's rate of achieving minimum objectives. If such changes do not result in accelerated rates, then further changes are introduced.

Since 1968, in Vermont, this behavioral model has been applied and refined by over 500 elementary teachers and has resulted in over 1,000 applications of the principles and methods of behavior theory to enhance the educational progress of elementary children eligible for special education. (See Christie, Egner, and Lates, 1972, for representative case studies presented by classroom teachers

at the Vermont Third Annual Convention of Behavioral Educators.)

Since 1971, the Special Education Program and the Secondary Teacher Education Program of UVM's College of Education, in cooperation with the Vermont State Department of Education, Division of Special Educational and Pupil Personnel Services have been exploring the application of the behavioral model to secondary education.

Consultation Training: Through consulting procedures, teachers are informally trained to provide special education services to their students. Consulting procedures start when a student is referred by a regular class teacher. The consulting teacher helps the teacher define the problem behavior in observable, measurable terms, together they develop a simple measurement procedure which can be implemented by the teacher.

After at least two data points have been obtained (one which must have been determined reliable by a second observer) indicating that the student is functioning below the minimum expected objective(s), a parent conference is scheduled to explain that the student is eligible for special services. During this conference, the data is explained, as well as possible changes which may be implemented. Written permission must be obtained in order to provide special services to the student. The consulting teacher then observes the student in the class setting and after conferences with the teacher and student, helps the teacher modify the teaching/learning procedures. The parents and supervisors are continually informed of the procedures. Evaluation of the procedure(s) is based on the student's performance, if his behavior changes to the acceptable specified rate, an exit interview is held. If the student has not

reached the minimum objective(s) then continued changes are made until the student does achieve the objective(s).

Throughout the consultation process teachers are taught to perform specific tasks. They learn how to define, observe, measure, record and evaluate critical behavior(s). They also learn how to make educational decisions based on their records of student performance.

Workshop: Consulting teachers offer workshops for state recertification credit. As a part of these workshops, teachers are required to read and respond to introductory readings on applied behavior analysis and individualized instruction as well as the rationale for the consulting teacher approach to special education. They also serve one student eligible for special education. Upon completion of service to students, the teachers write a summary of the service and present the results to their colleagues.

Formal Coursework: As associate faculty of the Special Education Program at the University of Vermont, consulting teachers offer twelve credit hours of the principles of analysis behavior, individualized instruction and specification of minimum objectives and the development of reliable measurement systems to regularly access their learner's progress. Through these graduate courses, teachers measure and improve the behaviors of eligible students, and verify their teaching/learning procedures either by an ABAB or multiple baseline design, write up the results of their studies and explain the results to students, colleagues, supervisor(s), and parents.

A BRIEF SUMMARY OF SECONDARY SPECIAL EDUCATION PROJECT

SCHOOL YEAR 1971-72

Purpose - To define the academic and social needs of secondary age (grades 7-12) students and to identify training procedures which will enable educators to meet the needs of those students.

Procedure - Consultation service as well as fifteen workshop sessions were held at the Albert D. Lawton Intermediate School from December 9, 1971 to May 25, 1972. The workshop sessions were held from 3:15 to 4:15 and focused on an introduction in the areas of behavior analysis and individualized instruction.

Personnel - An Essex Junction parent, was trained as the project aide and was responsible for obtaining reliability checks for classroom teachers as well as tutoring four students. Twelve teachers, two administrators and one guidance counselor from the A. D. Lawton School participated in the workshop sessions. The two administrators and three teachers completed requirements necessary for certification credit.

SUMMER SESSION 1972

Purpose - To provide training courses for secondary teachers who work with students who are functioning below the minimum academic and/or social objectives of their schools.

Procedure - Thirty class sessions were held at the Albert D. Lawton Intermediate School. The sessions ran from 8:00 to 12:00 daily July 5th through August 16th. The courses were devised so that teachers could work through the units at their own rate. Individual conferences were held from 8:00 to 9:15, presentations were scheduled by the participants from 9:15 to 10:00. Each teacher tutored a secondary age student from 10:00 to 10:30 and was a member of a team which conducted a Language Arts class from 10:30 to 11:00 or a math class from 11:00 to 11:30.

Personnel - There were four teachers and a guidance counselor from the Albert D. Lawton School, two teachers from the Essex Educational Center and thirteen teachers from around the state enrolled in the summer session. Twenty-two secondary age students from Essex Junction schools received $2.00 a day for attending these classes from 10:00 to 11:30 daily.

SCHOOL YEAR 1972-1973

Purpose - To further research the most appropriate methods for inservice teacher training to meet the special educational needs of secondary age students.

Procedure and Personnel - Consultation services as well as graduate courses were made available to the teachers who attended summer school from Essex Junction, Burlington and Hinesburg. The courses were developed to enable teachers to learn more ways of helping students reach the minimum academic and/or social objectives of their schools. Service results are summarized in the following chart.

The studies presented herein should be viewed from two perspectives: 1) the specific outcomes of each and 2) generalizations that can be made with respect to the potential of an inservice approach to responding to the special needs of secondary school students within the context of the normal classroom. The specific outcomes of each study are reported for each study; consequently the discussion that follows relates to the second perspective.

The preparation of special education teachers or resource rooms are two current popular approaches to responding to the needs of secondary school students with academic and social deficits. These approaches seem to be efficient but costly ways of helping a limited number of students. For example, a study conducted by one of the participating schools showed forty-nine percent of a class was below grade level in

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SERVICE CHART
1972-1973

Secondary students (grades 7 9) referred to S.S.E.P. had academic deficits ranging from 1-7 years below grade level (as determined from daily work, minimum objective measures and/or standardized tests) in the areas of math, English and reading. Many of these same students were also referred because of social problems such as physical and verbal aggressions (to peers and/or teachers).

The following chart shows the numbers of students served in each of the four schools.

A.D. LAWTON INTERMEDIATE SCHOOL

Teachers	Students	Behavior	Design
Jodoin	21 (Target Class)	English	ABAB & M.B.
Keene	21	Reading	ABAB
Walford	21	Math	ABAB, M.B.
Gardner	21	Study Hall	ABAB
Nichol	1	Reading	ABAB
Sprout	10	Reading	ABAB
Stanton	1	Social	AB
Totals ___ 6 Teachers ___ 32			

ESSEX EDUCATIONAL CENTER

Malcolm	3	English	2 - ABAB 1 - BAB
Meyers	2	Math	1 - C.C. 1 - M.B.
Totals ___ 2 Teachers ___ 5			

HINESBURG ELEMENTARY (7th and 8th)

Delneo	5	English	M.B.
Nicolino	10	Math	2 - ABAB 8 - AB

HUNT JUNIOR HIGH

Bean	2	Math	ABAB
Epifanio	2	Reading	1 - BAB 1 - ABAB
(Mudgett) Leach	2	English	ABAB/M.B.
Totals ___ 3 Teachers ___ 6			

TOTAL 13 Teachers 58 Students

mathematics as measured by standardized testing procedures. Data such as this leads to the conclusion that the self-contained special education classroom will not be able to serve the large number of students who are functioning below grade level in many schools.

By maintaining the special classroom or resource room environment it is implied that regular secondary teachers can not educate and manage the exceptional student. The Secondary Special Education Project at the University of Vermont has assumed that with training and support, teachers can learn to provide effective and humane learning environments for the special student. Here students are maintained in "regular classrooms". Through inservice training and continued consultation, teachers provide special services while maintaining the student in the mainstream of school life and also by providing services to a much larger number of students than can possibly be served by the special education or resource classroom approach.

The work presented in this volume have a number of factors in common. In all cases the research was conducted by a full time teacher of a basic subject in a conventional secondary school. Each research design was the result of consultation with a member of the university faculty or a secondary school consultant in training.

The teachers whose work is represented through the research reported herein have attempted to create individualized, responsive learning environments. Each teacher responded to a student's deficit performance by changing learning environments and observing the effects of these changes on student performance. Teachers collected and arranged both commercially prepared and teacher prepared learning materials. They maintained a complete record of the student's daily and monthly progress.

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By emphasing an individual approach to providing varied materials as well as individual consequences, the utilization of applied behavior analysis techniques is a rather natural component to evaluate and improve the instructional and managerial functions of the teacher. Those who wish to work toward the remediation of learning deficits of secondary school students through applied behavior analysis will need to give teachers considerable assistance with respect to the management aspect of materials, consequences, and measurement of student progress. If this is done the probability of successfully applying behavior principles and procedures will be greatly increased.

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Hunt Junior High School

by

Richard V. Lates

Lyman C. Hunt Junior High School is located in the North End section of Burlington, Vermont, a city of approximately 43,000 people. The "North End" is a rapidly growing suburban residential region of the city comprising about one quarter of its population. Recent urban renewal housing projects in the North End have resulted in a much more heterogeneous population within the school than existed previously.

Students come to Hunt from three surrounding elementary schools. In 1972-73 Hunt School had an enrollment of 642 students in grades 7 through 9 and a departmentalized teaching staff of 34 (plus a principal, assistant principal, librarian, and two guidance counselors). Students are scheduled in two stanine groupings (1-6 and 5-9) with one representing highest achievers and 9 representing lowest. Students follow a revolving schedule of academic classes: math, science, language arts and social studies, and electives: industrial arts, creative arts, home arts, music and physical education.

Two 7th grade language arts teachers and one 7th grade math teacher have been trained to develop minimum objectives and measure individual students' progress under the Secondary Special Education Project during 1972-73, and one 8th grade teacher from each of these departments will receive similar training in the coming year.

The Effects of Immediate Correction on Improving Seventh Grade Language Arts Performance

by

Donna Mudgett Leach and Margritte Graves

The effects of teacher attention on classroom behaviors of elementary children have been well researched. Hall, Lund, and Jackson, (1968) and Harris, Wolf, Baer (1964), Harrison (1973) and Schutte and Hopkins (1970) showed that academic responses such as accuracy and following directions can be improved with contingent teacher attention. Hasazi and Hasazi (1972) indicated that a teacher could inadvertently increase errors as a function of increased attention. Brigham, Graubard, and Stans (1972) greatly improved the writing output by systematically varying contingencies. This study applied teacher attention (praise plus immediate correction) on correct sentence writing responses in two seventh grade students.

Method

Student and setting

This study was conducted in an average seventh grade language arts class. The class met for 50 minutes a minimum of three days per week on rotating schedule.

At the beginning of the school year all students in the class were administered an entry level test on seventh grade minimum objectives. Betty and Jane were two thirteen year old girls who scored below the mastery level. Betty scored 3% and Jane scored 0% compared to the minimum expected score of 10% for September.

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Procedure

The teacher defined six areas of concern for seventh grade writing including complete sentences with at least five words in each sentence, punctuation, capitalization, agreement between subject and verb, and identification of the subject and verb. For each writing assignment, the teacher recorded each student's performance on a data sheet similar to that shown in Figure 1.

The total number of criteria met was divided by six, multiplied by 100 to determine a percent of criteria met for the daily sentence writing assignment.

The percent of agreement between the teacher and the second observer was 100% on all products. Whenever there was some discrepancy in scoring, permanent products were observed until errors causing discrepancies were determined and 100% agreement was reached.

At the beginning of each period the teacher gave Betty and Jane a sheet of writing paper and asked each student to write ten sentences. No other instructions were given. At the end of ten minutes, the teacher collected the papers.

Baseline

During baseline conditions, the students put their papers on the teacher's desk as soon as they were completed, or the teacher collected the papers after ten minutes. The teacher scored the writing papers after the student left the classroom and not in their presence.

Immediate Correction

During the experimental condition the teacher provided immediate correction for Betty beginning on session nine, while she continued to record Baseline performance for Jane.

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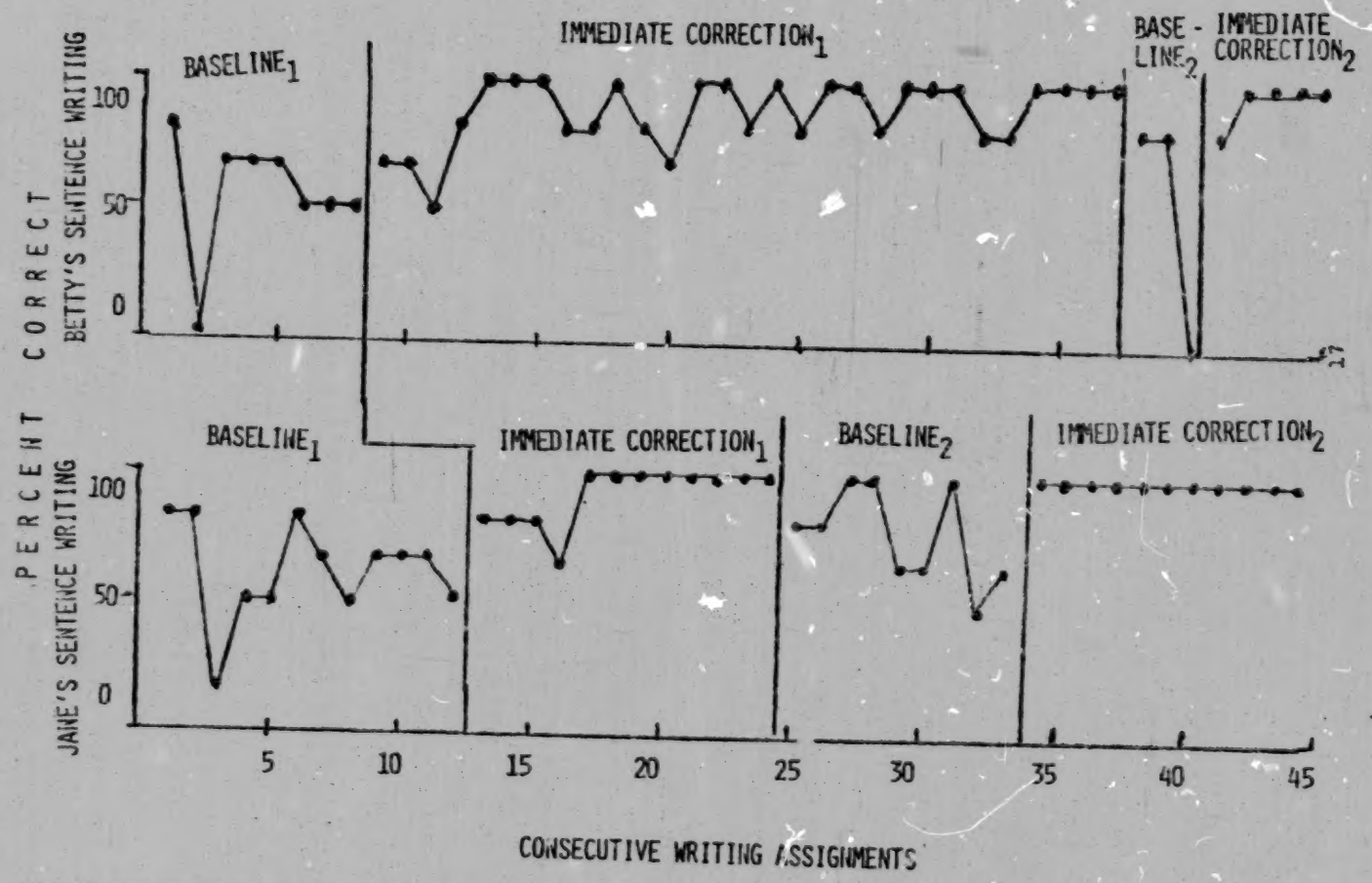

FIG. 2 THE PERCENT CORRECT SENTENCE WRITING RESPONSES ACHIEVED BY BETTY AND JANE DURING EACH CONDITION

IO = INSTRUCTIONAL OBJECTIVE

Betty was instructed to raise her hand each time she completed a sentence. The teacher then went to her immediately, marked a C on each part of the sentence which met criteria, and praised her good performance. The teacher made no comment or marks for incorrect responses.

Immediate correction was introduced for Jane four sessions after it was applied for Betty. The same immediate correction procedure was then in effect for both students.

Baseline$_2$

After session 29 for Betty and session 24 for Jane, the immediate correction procedures were removed. During this condition, the students began to request the teacher's attention for correcting their work. The teacher tried to ignore these requests by continuing whatever she was doing.

Immediate Correction$_2$

Immediate correction was reinstituted as described above.

Results

Figure 2 shows the percentage of criteria met for each student during each condition. For both students, daily performance improved under the immediate correction condition when compared to baseline performance. Betty averaged 54% (ranging from 0 83%) during Baseline$_1$ and 55% (ranging from 0 83%) during Baseline$_2$ compared with averages of 90% (ranging from 50-100%) and 97% (ranging from 83-100%) during immediate correction$_1$ and $_2$ respectively.

Jane averaged 61% (ranging from 17 83%) and 80% (ranging from 50-100%) during Baseline$_1$ and Baseline$_2$, respectively, compared with 93% (ranging from 67-100%) and 100% during immediate correction$_1$ and $_2$, respectively.

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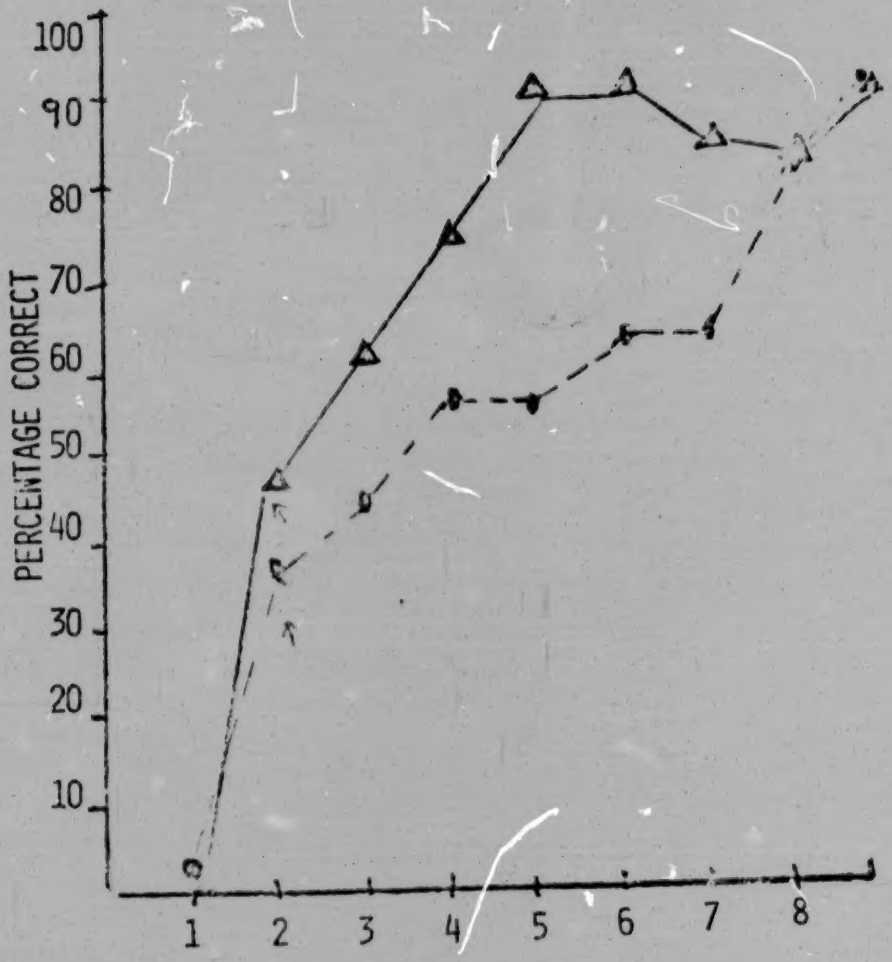

FIG. 3. JANE'S (△—△) AND BETTY'S (○—○) SCORES ON LANGUAGE ARTS ACHIEVEMENT TESTS GIVEN ONCE A MONTH. THE ARROW INDICATES THE FIRST TEST AFTER THE INTERVENTION PROCEDURE FOR SENTENCE WRITING.

Concurrent improvement in sentence writing was also noted on the monthly achievement test on minimum objectives for both girls, as shown in Figure 3. Betty improved from 3% in September to 37% in October, whereas Jane improved from 0% to 48%. Improvements were specifically noted in the areas requiring complete sentences.

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The Effects of a Team Versus Individual Contingencies for Completing Assignments in Seventh Grade Arithmetic

by

Rosemary Getsie, David Bean and Ann Egner

Although applied behavior analysis techniques are generally oriented to the individual, many studies have described procedures of using group consequences to improve classroom behaviors. These procedures require each member of the class to meet specified criteria before reinforcement occurs for the group.

In Good Behavior Game, (Barrish, Saunders and Wolf, 1969), individual contingencies for group consequences were successfully applied during two different class periods. As a result of the game, disruptive out-of-seat and talking out behaviors were significantly and reliably decreased.

Operant principles, using the combined behavior of a class as the dependent variable, were utilized in two classes of second and fourth grade children (Schmidt and Ulrich, 1969). The noise levels and out-of-seat behaviors declined significantly in both classes when reinforcement (additional gym time) was made available for appropriate group behavior.

Group contingencies have also been effective in increasing academic performance. Fourth grade students were reinforced on the basis of group gains made on weekly math, reading and spelling pre-post tests (Hamblin, Hathaway and Wodanski, 1971).

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At another time, they were reinforced on the basis of individual performance but it was found that academic performance (test gains) improved systematically with the introduction of group consequences.

Schultz and Ayala (1971) found that when teacher praise, stars and treats were compared for a second grade class, 100% of the childrens' papers were completed only during the group contingency.

In an attempt to increase the percentage of junior high students who attained criterion on daily quizzes in math and science, an activity room was made available to the students who achieved the criterion (Runnels, Diaz, Freeman, Woods and Bostow 1972). The percentage of students who attained criterion rose from 70% to 100% on the days when students could earn their way into the activity room.

This study evaluated the effects of individual contingencies versus group contingencies (access to an activity area) on the completion rate of two students in two seventh grade math classes.

Method

Student and setting.

Todd and Stan were students in two different seventh grade math classes. Todd was a 13 year old boy who had repeated both first and fourth grades. On an SRA achievement test given in the sixth grade Todd scored at least 2.0 years below his actual grade level in all subjects and at least 4.0 years below his expected grade level. He scored a grade equivalent of 3.2 years in math. Teachers' comments included unwilling to assume responsibility and needs direction.

Todd's math class has 31 students who are grouped by sixth grade teacher judgements of ability and achievement. Rankings ranged from one (very high) and nine (very low). Todd's class ranged 1-6.

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Stan was a twelve year old boy. On an SRA Achievement test given in the fourth grade, Stan scored a grade equivalent of 4.9 in math. However, when in grade six, he scored a grade equivalent of 4.8. Previous teachers' comments included Stan is capable of achieving but is slow and needs direction. Stan's math class had 28 students ranking 5-9.

Each student in these classes was responsible for independently completing units of work which were divided into daily assignments. Students were expected to complete at least one assignment in a unit during a 35 minute independent work period. When a student completed his assignment during the 35 minute period he was given ten minutes of free time to play math games in the back of the room.

Students progressed to the next unit of work when the previous unit had been mastered. Mastery of a unit was determined 80-100%. When a student achieved 80-100% on two consecutive daily assignments, he could elect to take the unit test. If he scored less than 80% on daily assignments the teacher reassigned daily work until the student passed the test at 80-100%.

The teacher expressed concern that most of the students in both classes were not completing their daily assignments. Todd and Stan were chosen as target students for this study because their completion rates were particularly low.

Response Measures

The behavior to be measured was task completion, defined as the completion of those daily assignments which comprised each unit.

At the end of a 35 minute independent work period, the teacher asked those students who completed a day's assignment on a completion check list, by recording a 'C' on a data sheet for student's who

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completed assignment and I" if the assignment was not completed.

All of the students' written work was kept in individual folders. An independent observer checked the written work for completion periodically. The teacher obtained a measure of class completion by counting the total number of students who had completed an assignment.

Procedures

Baseline: During baseline, the teacher set an oven-timer for 35 minutes. During this 35 minutes, each student worked to complete an independent assignment. Students who had questions could go to the teacher for individual conferences or for new materials, unit tests, and so on. The teacher occasionally circulated around the room to hand back corrected papers and discuss student assignments. When the timer rang the teacher recorded completed assignments as noted above. Students with completed assignments were than permitted to have the remaining ten minutes of class as free time to play math games.

Team Contingency:

Each class was divided into teams of approximately four students. Each student's baseline completion rate determined his placement on a team. As much as possible, two students with high completion rates and two students with low completion rates were members of the same team. Each team sat together at tables.

The following rules were explained and posted

1. The timer will continue to be set for 35 minutes of the math period.
2. During the 35 minute period each team, or all teams, may earn certain privileges.

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3. Each team member must complete a minimum of one day's work in a unit. Any team member who has completed his work during the 35 minutes may continue to receive ten minutes of free activity time at the end of the period. The team will receive ten minutes which may be accumulated toward a day off.
4. The team will receive an additional bonus of five minutes free time for each completed assignment above the minimum.
5. As soon as a team accumulates 55 minutes of free time, the team may elect to take an entire math period for free activity time. Time may be accumulated up to 110 minutes. Time acumulated over 110 minutes will not be honored.
6. Free time will be recorded by a team member elected by the team and also by the teacher.
7. Team members may encourage and assist one another, although giving answers is not permitted. If any member of a team gives or takes answers, the team will forfeit any bonus time they have earned to date.

Baseline$_2$

During this condition, the team contingency was no longer in effect. The teams were dis-banded.

Team Contingency 2

The teams were re-organized and the conditions of the team contingency system were reinstated.

Results

An ABAB design was used to evaluate the effects of the team contingency. Baseline completion rates for Todd and Stan were 14% and 42% respectively. When the team contingency for completion was in effect, Todd completed his assigned tasks 56% of the time and Stan

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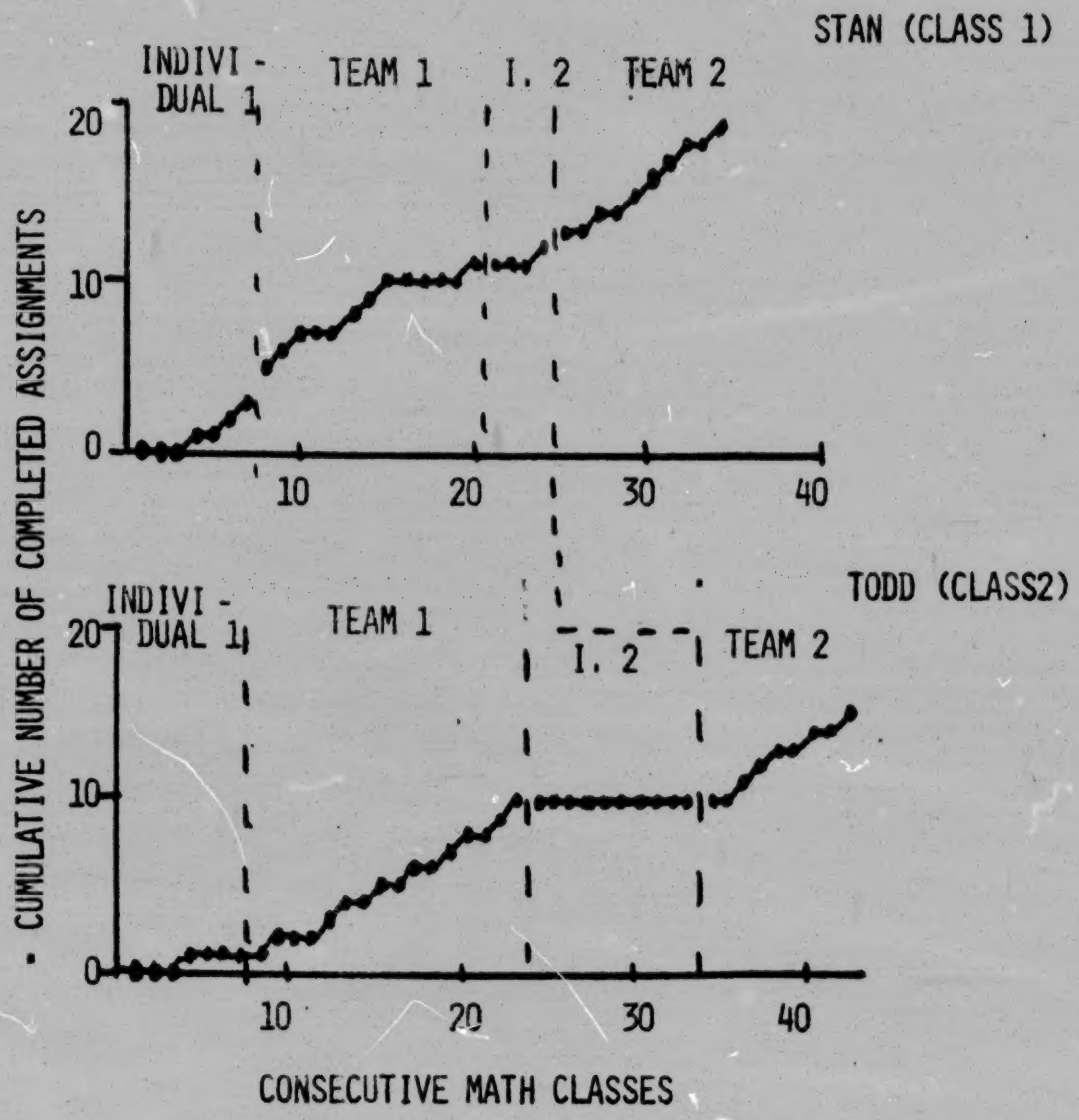

FIG. 1 THE CUMULATIVE NUMBER OF COMPLETED ASSIGNMENTS DURING DAILY MATH CLASSES FOR STAN (TOP GRAPH) AND TODD (BOTTOM GRAPH).

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completed his 54% of the time. When the team contingency was with drawn, Todd completed 0% of his assigned tasks and Stan completed 25%. The group contingency system was reinstated in Stan's class first. During this second team contingency, Stan again completed his assignments 55% of the time. When the team contingency system was reinstated in Todd's class after ten days of reversal, Todd completed his assigned tasks 60% of the time.

Figure 1 shows the accumulative number of assignments completed by Stan and Todd.

Figure 2 shows the number of students with incompleted assignments in both classes during all conditions. The high low high low pattern of incomplete assignments was demonstrated in both classes, indicating the effectiveness of the team contingency. For class 1, the number of students with incomplete assignments averaged 12.4 and 14.6 during Individual Contingency 1 and 2, respectively, compared with 6.5 and 7.4 during Team Contingency 1 and 2, respectively. Class 2 averaged 12.4 and 15.5 during Individual Contingency 1 and 2, respectively, compared with 8.4 and 14.7 during Team Contingency 1 and 2.

The data seems to indicate that the team contingency was not only effective in improving the completion rates of both boys, but was also effective in both classes.

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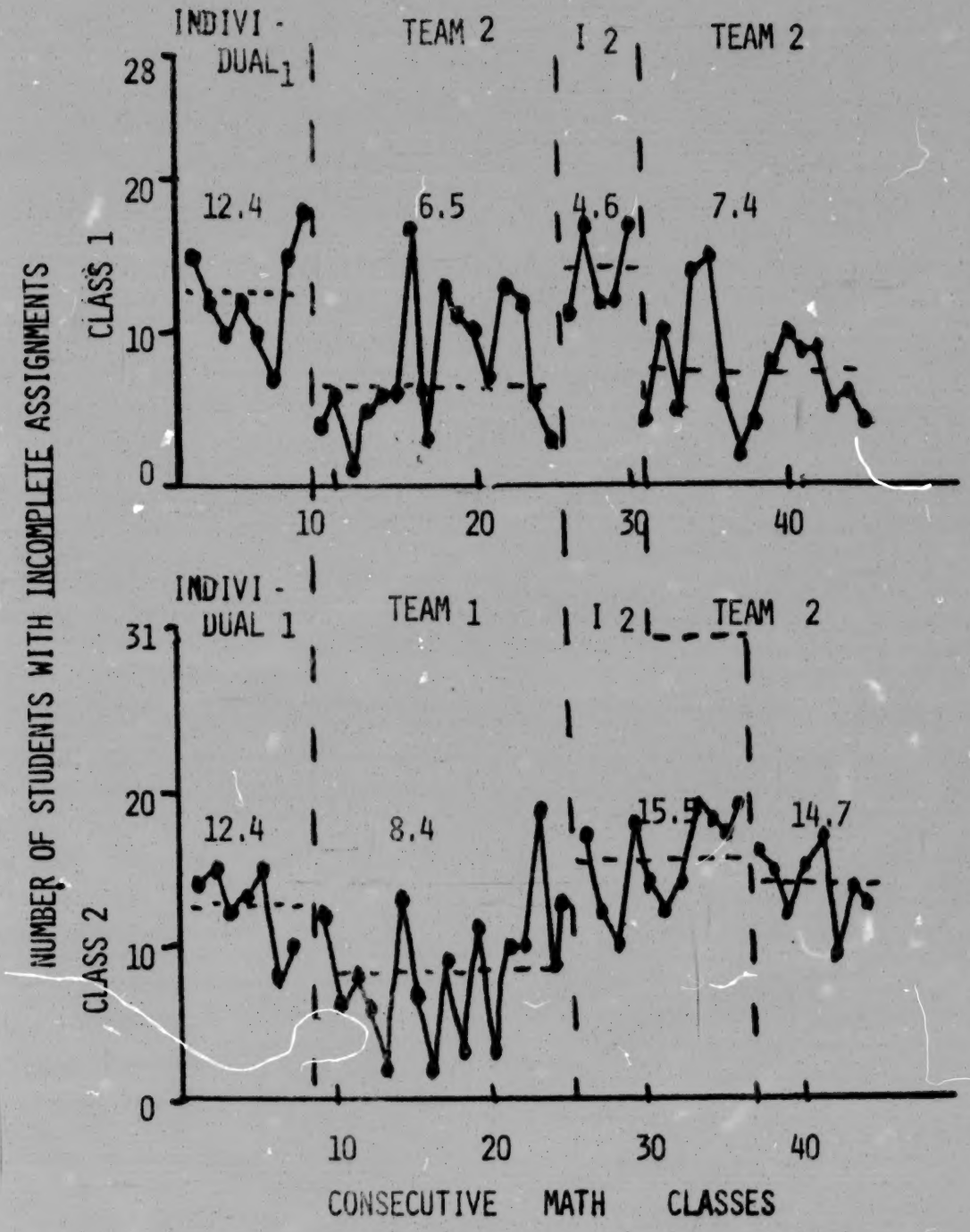

FIG. 2. THE NUMBER OF STUDENTS WITH INCOMPLETE DAILY ASSIGNMENTS DURING MATH CLASS 1 (TOP GRAPH) AND MATH CLASS 2 (BOTTOM GRAPH) DURING EACH CONDITION.

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Individualizing A Junior High School Environment: A Case Study

by

A. Egner, L. Babic, D. Cemel, J. Cross, P. Epifanio, M. Hampton, D. Leach, C. Lehouiller, H. Powell, and R.V. Lates

Elementary teachers* have successfully applied principles of behavior theory to ameliorate many academic and social problems for elementary school children. Junior high school applications are particularly challenging since the student no longer has only one teacher who manages his instruction and arranges consequences for his academic and social behaviors. This paper describes the efforts of ten people (four teachers, a guidance counselor, a school nurse, an assistant principal, a teaching aide, a volunteer worker for the probation office, and a consulting teacher) who attempted to establish a consistent daily program for a junior high school student.

* Christie, L.S., Egner, A.N., and Lates, B.J. A very special education for all children: Proceedings of the Fourth Annual Convention for Behavioral Educators. Montpelier, Vermont: Office of Federal Programs, Department of Education, 1972.

Description of the Learner and Learning Environment

Brett was a twelve year old male youth in his seventh year of school. He was enrolled in an urban junior high school of 642 students with a teaching staff of 34 (plus a principal, assistant principal, librarian and two guidance counselors). Students were grouped heterogeneously for core courses (such as language arts, mathematics, general science) in classes with enrollments of 25 to 35. Classes met at least 55 minutes each day on a revolving schedule such that a particular class which met at 9:00 a.m. on one day would meet on 10:00 the next day. It was the student's responsibility to know what time his classes met.

Brett was the second oldest of six children in a family with multiple problems including a history of child neglect, extreme poverty, poor health, and inadequate education. Brett was undernourished and small for his age. He had poor eyesight which was corrected only because the school nurse obtained funds for glasses and arranged for Brett's mother to take him for an eye examination. Finally, Brett had a skin condition (icthyosis) which caused scaly patches all over his body and was a source of constant embarrassment from peer remarks about that stuff all over him. This condition was greatly improved with consistent application of medication obtained by the nurse.

School records indicated that Brett had performed below grade level since first grade where he scored 86 on the Peabody Picture Vocabulary test. At the beginning of seventh grade on the Wechsler Intelligence Scale for Children, Brett scored a 79 on the verbal scale, 74 on the performance scale, with a 74 on the full scale. On the Wide Range Achievement test, he scored at the 3.4 grade equivalent in arithmetic, 2.2 in spelling, and 2.4 in reading. His reading teacher assessed Brett's functional reading performance (90-100% oral reading accuracy and comprehension) matched a __ grade equivalent on the _____ test.

Concurrent with a history of poor and unmotivated academic performance, Brett also had a record of disruptions and poor interactions with his peers as well as adults. During his first six weeks of junior high school, Brett consistently skipped classes, displayed a negative attitude towards teachers and was involved in several severely disruptive fights with other students. In addition, Brett was cited for shoplifting which led to delinquency petitions and later adjudication.

Individualizing the Schedule

The first step towards developing an individualized program for Brett was taken by the school guidance counselor and assistant principal. Brett's daily schedule was modified so that he could attend the same regularly scheduled classes each morning and then be dismissed for the afternoon. In this way both Brett and his teachers could expect the same basic arrangement each day: a small reading group from 9:00 a.m. to 10:00 a.m.; one-to-one language arts lessons from 10:00 a.m. to 11:00 a.m.; and a social studies class

with 25 other students from 11:00 a.m. to 12:00 p.m. At noon, he met the assistant principal who then permitted him to go home.

Individualizing Instructional Objectives

In order to enable Brett to achieve success, his teachers derived the following basic objectives for academic and social behaviors:

Given a daily reading period (9:00-10:00) and a daily language arts period (10:00-11:00), the student will complete assigned tasks 100% of the time.

Given a daily reading period (9:00-10:00) and a daily language arts period (10:00-11:00), the student will conduct himself appropriately such that there are NO occasions of 1) smoking in class; 2) loud disruptive noses; 3) physical aggression; or 4) leaving the classroom without permission.

Measurement and Reliability Procedures

1. Attendance. Each teacher noted whether Brett attended class. The school secretary also kept a record of attendance.

2. Task Completion. The teacher assigned a number of tasks and counted the number completed each day during each class.

3. Disruptions. The teacher tallied each occasion of disruptive behavior.

Occasionally a second observer obtained the same measures as the teachers. In all cases, there was 100% agreement on the occurrance of attendance, task completion, and disruptions.

Classroom Procedures and Materials

The reading, language arts, and social studies curricula were unique in that a basic set of instructional objectives for seventh grade had been derived by the team of language arts and social studies teachers. These objectives focused on the development of basic skills of reading to gain information, outlining information, writing, project preparation, and project reporting (both written and oral).

For the students with severe reading deficits, the reading teacher focused on teaching basic vocabulary, oral reading accuracy, and comprehension on material that would enable the students to meet the language arts and social studies content areas. The teachers had also developed a monthly measurement procedure to assess each learner's mastery of these basic objectives. This frequent measurement system allowed them to assess the effectiveness of their general teaching/learning procedures on each individual learner's progress. For those learners who did not show progress, the teachers tried different techniques or materials in order to accelerate the learner's progress. Thus, although all learners were working on the same general tasks, specific assignments for individuals were different.

Brett's reading assignments were made from a variety of materials including the New Practice Readers[1] (Books A and B) which focused on vocabulary acquisition, oral reading accuracy, and written comprehension.

Language arts assignments were made from teacher prepared worksheets on spelling, grammar, sentence writing, outlining, and

[1]Stone, C. The New Practice Reader. New York: McGraw-Hill, 1962.

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so on. Vocabulary and comprehension skills were stressed.

Social studies tasks included teacher prepared worksheets on map and global skills. Regular project work focused on showing the general characteristics of various climates with descriptions and drawings of selected animals.

Daily Teaching/Learning Conditions

I. TIME OUT CONTINGENCY FOR DISRUPTIVE BEHAVIORS. The time out from positive reinforcement principle[2] was used to decrease Brett's inappropriate classroom behaviors. Any time Brett smoked in class, physically aggressed, or left class without permission, he was taken to the assistant principal's office to be left alone for five minutes. After five minutes lapsed, he was permitted to return to class.

Brett's disruptive interactions decreased in frequency, intensity, and duration. During the first 15 days under this procedure Brett's outbursts ranged from 0 to 5 with an average of 1.1. During the remaining 50 days he attended school, the number of ourbursts ranged from 0 to 2 with an average of only .2.

II. FREE TIME CONTINGENCY FOR TASK COMPLETION. During reading and language arts classes the Premack principle[3] of reinforcement was used to increase Brett's rate of completing tasks. The Premack Principle suggests that a high probability behavior such as leaving the classroom may be used as a reinforcer to increase

[2]Time out was selected as the procedure of choice because research studies indicate that it is effective in reducing undesirable behaviors without the concurrent negative side effects (counter aggression, withdrawal and decrease in desirable behaviors as well as unobservable ones) that are observed when aversive stimuli such as shock, scolding, or spanking are used.

[3]The Premack principle is also known as "Grandma's Rule." Common examples include, "Eat your spinach before your ice cream" and "Take out the garbage before you watch T.V.

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a low probability behavior such as studying. Immediately upon completion of an assigned task, Brett was permitted to choose from a list of "free time" tasks including such activities as leaving class for a drink, helping the aide staple papers, playing with magnets, listening to stories on a tape recorder, drawing with magic markers, and so on.

The principle of successive approximations was introduced by simply asking Brett to complete brief assignments which were then gradually lengthened as he began to experience success. Assignments were listed each day with assigned tasks scheduled for 10 to 15 minutes followed by a five minute "free time" task. A timer was set for 10 or 15 minutes when Brett was given his first assignment. When the bell rang, the teacher or aide checked to see if it was completed. Brett marked a + on the assignment sheet, chose his free time task, and set the timer for five minutes. When the bell rang, he went on to the next assigned task. If an assignment was not completed, Brett was not permitted to choose a free time task but went on to the next assignment.

Gradually, time on assigned tasks was increased and time on free time tasks was decreased as shown in the following table:

Days	Work Time	Free Time
1-8	30	25
9-35	35	20
36-37	40	15
38-45	50	5
46-57	55	0
58-65	50	5

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Expansion of Brett's Daily Schedule and Removal of Free Time Contingency. By the 45th day Brett had shown such a consistently improved pattern of academic and social behavior that he was permitted to attend an additional class (science) from 12:00 to 12:25, go to a cafeteria job from 12:25 to 12:45 and stay for lunch period from 12:45 to 1:10. To enable Brett to pay for lunch, the assistant principal set up a job for Brett in the school cafeteria.

The science teacher particpated in the development of some basic objectives for a science unit. The reading teacher developed a vocabulary acquisition procedure for science words, and the language arts teacher assigned science lessons on tape which were then to be outlined by Brett. Thus, inadvertently, all of Brett's "free time" during language arts and reading classes was devoted to acquisition of science material.

Return to free time contingency. On day 58, Brett's assignments were rearranged to permit five to ten minutes of free time for 100% task completion at the end of each reading or language arts period.

On day 65 Brett's family unexpectedly moved out of the district.

Results. Figure 1 shows Brett's task completion during reading and language arts period under the free time and no free time conditions. The dramatic "rise-fall-rise" pattern assured the teachers that the continuation of free time choices was an essential and important part of individualizing Brett's instruction.

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Moreover, during the no free time condition a marked change occurred in Brett's attitude towards school in general, his teachers, and the work. He returned to his former practices of being late or absent from school and being unfriendly to his teachers. He began to speak negatively about school, teachers, and he continually needed to be prodded to do his work. He became apathetic and often complained about "too much work."

Fig. 1. A comparison of Brett's completion of daily assignments in reading and language arts during each condition.

Finally, even Brett's attendance at school changed markedly during this condition. He was present only 68% of the time compared with 100% attendance during the month prior to removal of the free time. When free time was again reinstated, Brett attended school 100% of the time until his family moved. Brett's attitude returned to friendliness and cooperation and he began coming to school early again to chat with his teachers.

III. DEVELOPING INDEPENDENT STUDY HABITS. To enable Brett to learn appropriate study habits, the following objective was derived:

> Given daily reading and language arts periods, the student will attend to assigned tasks at least 80% of the time and will learn to assess his own study behavior with 90% to 100% agreement.

The reading teacher and aide obtained a daily measure of Brett's study behavior by observing him at the end of 10 three

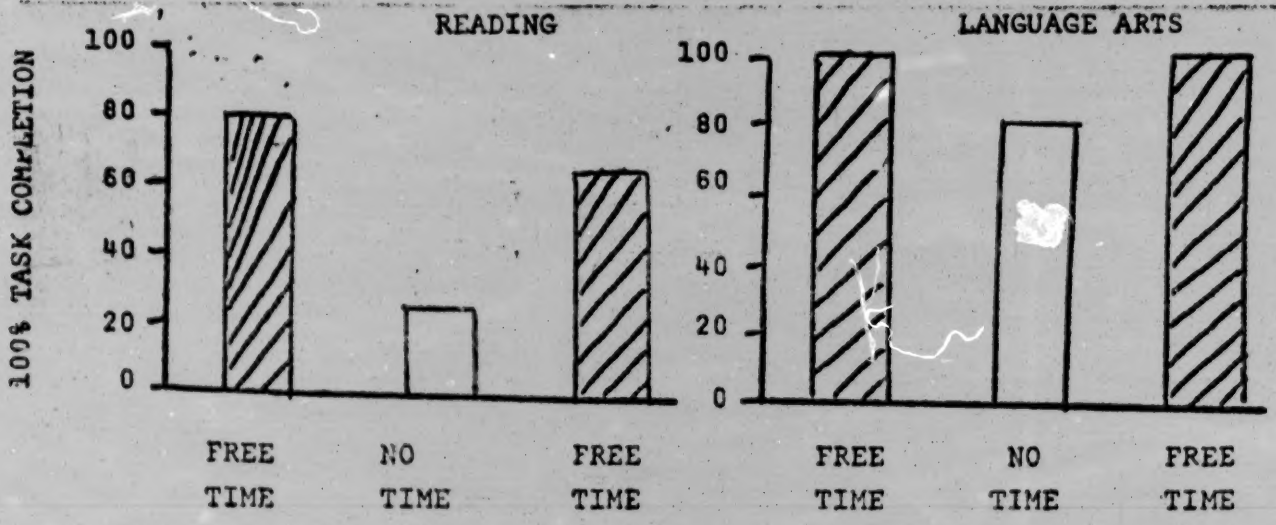

Fig. 1. A comparison of Brett's completion of daily assignments in reading and language arts during each condition.

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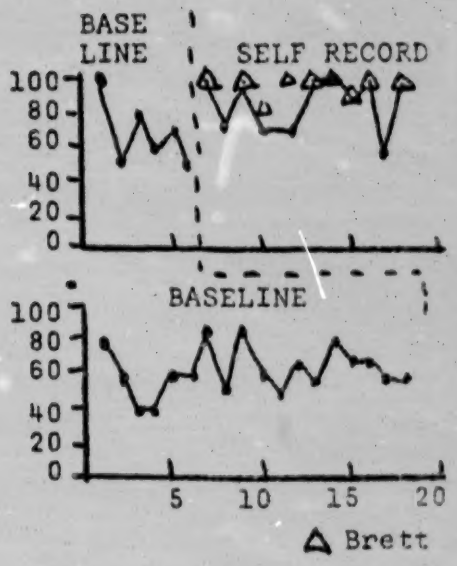

Fig. 2. The teacher's record of Brett's study behavior during two classes. The triangles show Brett's self assessment

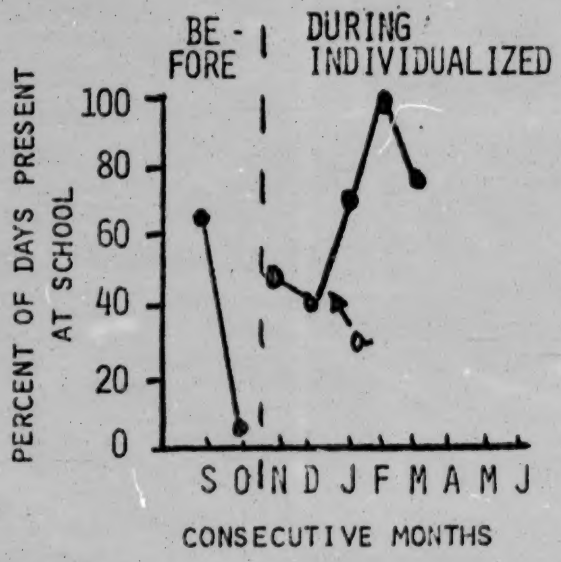

Fig. 3. The school's record of Brett's attendance during each condition.

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minute intervals. They recorded a + if Brett was attending to his task and a if he was not. A percentage of attending for each period was calculated by summing the number of +'s and multiplying by 10. Reliability of their measurement was obtained by a second observer who simultaneously recorded Brett's attending behavior in the same manner. A percentage of agreement was obtained by matching the observer's and teacher's records, summing the number of agreements, and multiplying by 10.

A "self recording" procedure was developed to help Brett assess his own appropriate study behavior. In a discussion with his teachers and aide, he helped define good study behavior and expressed a desire to learn how. When the measurement system was explained to him he recorded his own study behavior in the same way as the aide. Later he compared his record with the aide's. When results were the same, the aide praised him.

Results. The concurrent general increase in study behavior during the period he recorded his own behavior and the continuation of the same general pattern of behavior during the other period when self recording was not in effect indicates that this procedure holds promise in developing good study behavior. Brett's self-assessment was accurate as indicated by the close agreement of his record and the teachers' records.

Fig. 2. The teacher's record of Brett's study behavior during language arts (top) and reading (bottom). The triangles show Brett's self assessment.

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Effects of the Total School Program on Attendance

Figure 3 shows the percentage of days when Brett attended school each month. Prior to the development of the individualized schedule and assignments, Brett's attendance record showed a declining trend which was gradually but systematically improved with the introduction of the program. The arrow indicates when Brett was adjudicated and a positive liaison[4] with the probation office was developed through a volunteer worker for the probation office who became Brett's "big brother" and friend. The volunteer helped Brett make new friends, took him on Saturday outings, and visited Brett at school which brightened Brett's world. The volunteer also became an accepted friend of the family who was called by Brett or his mother when home crises occurred. Finally, the volunteer often prompted Brett to attend school on time (by calling his home early in the morning).

Fig. 3. The school's record of Brett's daily attendance for each month of the school year.

Summary of Results

Reading: Brett's functional reading level improved from 1.0 to 3.5 during the 65 days he attended school under the individualized program. During the last 20 days, all assignments were on a third grade equivalency and on the McGrath Oral Reading Test he scored a high third grade equivalent. In addition, he showed a marked change in attitude towards his oral reading assignments (from reluctance and hositlity to agreement and volunteering.)

[4]Mr. Donald Allard was the probation officer in charge.

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Language arts: Before the individualized program, Brett would only write his name. During the program, he consistently improved in writing skills by writing sentences about interesting pictures to show use of spelling words, outlining social studies and science assignments, and answering comprehension questions about reading assignments. He also began to read unassigned books of particular interest to him.

Social studies: Brett's assigned social studies activities were completed with a positive quality. Brett was most successful and more involved when he was on a one-to-one basis with the teacher. His conversations with the teacher improved in terms of expressing his values, social attitudes, and life style.

Discussion

The effects of such a total school and other agency involvement cannot be adequately reflected in graphs. However, they do serve the purpose of evaluating immediately any intervention procedure which can be immediately changed if the learner is not benefiting (as in Figure 1).

The most valuable outcome of this project can be seen in Brett's new found enjoyment of academic tasks and in the development of a positive school-student rapport. Many mornings Brett came to school 30 to 40 minutes early just to have coffee and donuts with his teachers. He also attended youth activities on several evenings during the school year.

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A second valuable outcome is the revelation that Brett can learn, and learn quickly. He dramatically improved his reading skills and in only 65 daily reading sessions, a total of two grade levels. His basic written communication skills improved to the extent that he even began to write notes to his mother and teachers. His social interactions with adults also improved such that he often smiled and greeted teachers in the halls. Finally, the frequency of fights with peers completely disappeared during the time he was on school grounds.

A third outcome is the team interaction that enabled the program to be such a success. This experience indicates that it is possible to individualize a junior high school environment and that it is worth the effort to do so. However, as one participating teacher noted, "this effort must reflect a tremendous amount of personal commitment and/or dedication. This amount perhaps could be done only with one or two young people at a specific time." This can best be summarized by the following note of commendation written by the assistant principal and sent to all involved.

> "I feel that a note of commendation is in order to express my pride and gratitude for the amount of time and the creative efforts which you all expended over the past seven months in Brett's behalf. I think we have all learned a great deal about serving students more effectively from this experience and I am sure that we can now apply the skills we have learned to serve many more students who might not otherwise succeed. Brett has benefited in many ways from your efforts in preparing individualized programs in reading, language arts, math, and science, and especially from the warmth, human concern, and consistent direction which you all have given him. Once again, thanks for your excellent teaching."

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Teaching Self Discipline Through Contingency Contracting

by

Richard V. Lates and Ann Egner

School personnel are often required to monitor student conduct on school grounds. Generally, as students progress through their twelve years of school, they are expected to require less direct supervision from teachers as they assume more and more responsibility for their own conduct.

Traditionally, the principal of a school has the role of providing the ultimate consequences for infractions of school rules. When a student is "sent to the principal's office," depending on the seriousness of the infraction, the student may receive a variety of consequences such as simply sitting in a neutral environment; hearing a firm but kindly lecture on appropriate conduct, engaging in friendly but stern dialog about school rules, calling in his parents for a serious conference, or being dismissed or suspended from school. The success of these procedures has traditionally been variable: extremely effective for some students (i.e., those who are sent only once or twice), moderately effective for some (i.e., those who are sent for minor offenses five or six times), and quite ineffective for others (i.e., those "chronic offenders" who are continually being sent to the principal's office.)

"Contingency contracting" has recently attracted attention as a method for improving student school behaviors (Homme, 1969, Cohen, Keyworth, Kleiner, and Libert, 1971, McDonald, Gallimore, and MacDonald, 1970). This approach combines several well researched procedures of

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applied behavior analysis such as specifying target behaviors, shaping, and positive reinforcement.

A contingency contract is an agreement between two or more people which clearly specifies an "if...then..." requirement. The student has usually been familiar with contingencies: "If you do that bad thing once more, then you will get this bad consequence." A contingency contract states instead, "If you do this good thing, then you will get this good consequence." There are three major items in a contract:

1. Specific statement of the goal (responsibility)
2. Specific statement of the privilege (consequence)
3. A method of reporting

There are two features of contingency contracting which appear to be particularly attractive for junior high school students and personnel.

1. Direct involvement of the student and other "significant adults" in his environment (e.g., his teacher, counselor, principal, friend, parent, etc.). The student is expected to specify what positive consequences he is willing to earn. He is also responsibile for keeping records indicating his eligibility for the consequences.
2. Public statement of the contract. All parties are equally informed and thus ambiguity and indecision are minimized. There is no longer a need for long lectures about conduct or lengthy descriptions of retribution and consequences.

During the 1972-73 school year, a total of 8 contingency contracts were developed in mutual agreements with the referred student and at least one other person. These contracts were quite effective in reducing the number of occasions of "being sent to the office" for

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school infractions. Two sample contracts are described below.

Contract for Home Privileges

Jethro was an 8th grader who was referred by four different teachers to the principal's office to be disciplined for disruptive behavior on 8 occasions during the last three months of the previous year. These disruptive behaviors recurred immediately at the beginning of the new school year.

At a meeting with the guidance counselor, assistant principal and Jethro's parents, Jethro agreed to the following contingency: For each day of successful completion of assigned tasks in each class, Jethro would obtain a signature from the teacher. Jethro's parents agreed that each signature would earn him one privilege of his choice at home after school. At the end of the day, Jethro stopped to see the assistant principal who recorded the number of signatures.

After the introduction of this contract, Jethro was never sent to the office again. By February, Jethro was only intermittently receiving signatures and privileges but continued to maintain his improved school conduct. The privileges were varied according to Jethro's particular interests, including invitations to friends to visit his home, permission to visit at a friends home, excursions for fishing and other trips, and permission to stay up late or go to the youth center on weekends. His parents reported that the procedures were very effective. His teachers were quite impressed with Jethro's improvement. Comments on report cards after the contract was in effect included:

"His behavior has improved tremendously!"

"most improved student in the whole class!"

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"attitude and effort have also improved"

"improved attitude in class"

"Jethro has moved from a don't care attitude to a more positive attitude"

Contract for Youth Activities

Chuck was an 8th grader who was referred for disciplinary action a total of twelve times by four different teachers during a two and half month period. One teacher characterized Chuck as having, "the dirtiest mouth that I have heard in 14 years of teaching!"

At a meeting with the assistant principal and Chuck's mother, Chuck agreed to obtain daily signatures from two teachers in whose classes he was particularly disruptive. In return, Chuck's mother agreed to give him the privilege of attending a neighborhood youth center two nights each week.

Each day Chuck obtained two copies of the record sheet shown below and turned them in to the assistant principal at the end of the day for discussion and praise.

Name_____ Date_____

Class:_____

1. Attended class: Yes No
2. Class Disruptions: None Once Twice Three or More
3. Class Effort: Excellent Good Fair Poor
4. Classroom Achievement: Excellent Good Fair Poor

_____Teacher

On Friday of each week during the first month of this contract, Chuck's mother received a phone call from the assistant principal who described Chuck's progress in the two classes. At the end of the

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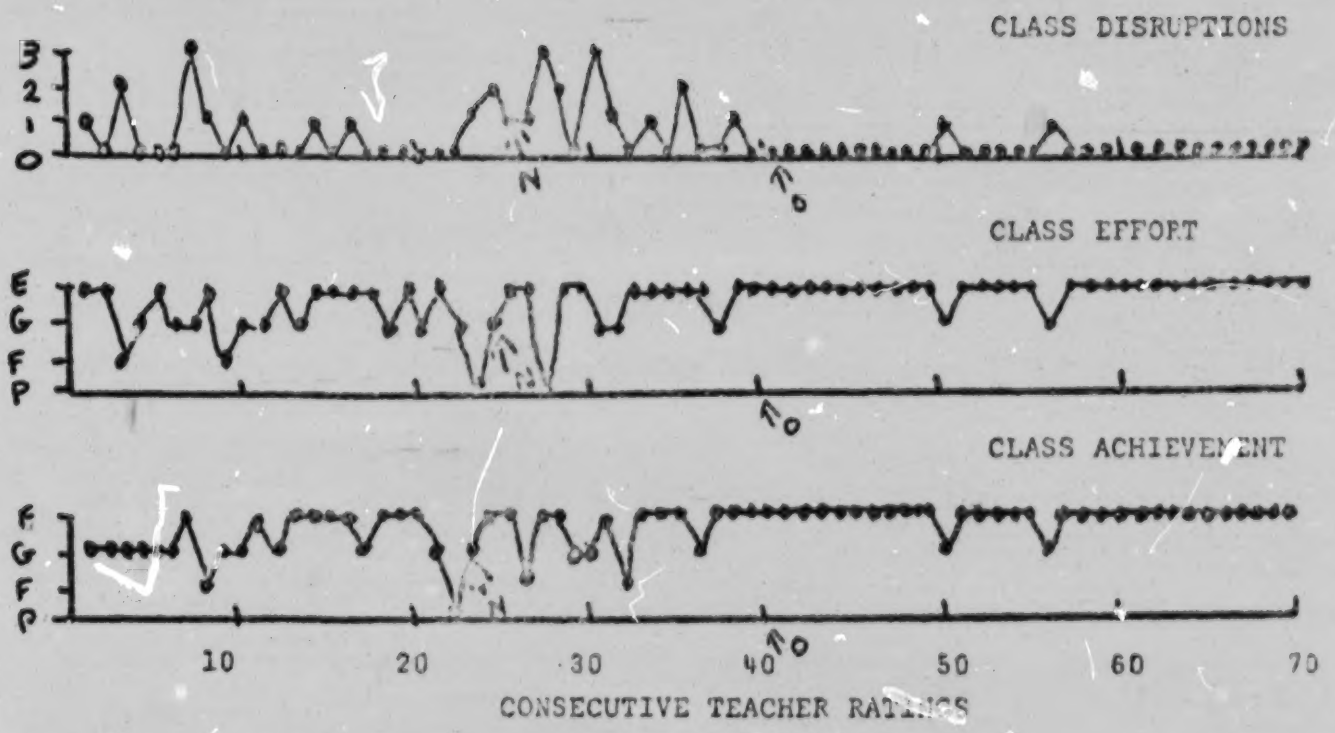

Fig. 1. The record of teacher ratings of Chuck's disruptions, effort, and achievement. At N, a new teacher took over science class and at O, the teacher for only one class rated his behavior.

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second month, the contract system was discontinued for one class, (a semester course), but continued for the other.

Figure 1 shows the teachers' rating of Chuck's disruptive behaviors, class effort and class achievement. After the contract system was established, there were no office referrals for classroom misbehavior.

He continued to show appropriate conduct even after the youth center closed for the holidays. Chuck appeared to receive sufficient reinforcement from teacher praise and assistant principal feedback for his progress. In addition, Chuck's academic progress improved as shown by the increased frequency of Excellent ratings on effort and achievement as the year progressed. Teacher comments on report cards issued after the contract included: "Chuck worked very hard once he got started. 100% improvement". "Complete change from a don't care to a willingness to work".

Chuck's parents were very enthusiastic by the outcome of the contracts. His mother especially encouraged the assistant principal to use the same procedure to "help other kids."

Most important, Chuck himself was aware of the effects of the contract. The following telephone interview was held after school was dismissed for the year.

Question: "What did you think of the contract system?"

Chuck: "The contract helped me out in school. Helped me to do better."

Question: "Why do you think it helped you to do better?"

Chuck: "I was trying not to goof off. I was trying to get less disruptions on the card. I wanted to get it signed."

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Question: "Do you think you'll need a contract next year at the high school?"

Chuck: "No. I don't need a contract any more. Are you going to try this on other kids?"

Question: "Yes. Do you think we should?"

Chuck: "Yes. It'll probably help them."

Question: "Did you feel that you were doing this procedure on your own without someone telling you what to do?"

Chuck: "Yes. I liked doing it myself."

Discussion

Figure 2 depicts the overall effectiveness of the contingency contract system on the frequency of referrals to the principal's office for disciplinary action. This system appeared to be dramatically effective in reducing the frequency of occasions which resulted in being sent to the office. Instead, a positive interaction was established whereby both youths received teacher and principal attention for appropriate classroom interactions. Moreover, the youths assumed the responsibility for engaging in these appropriate teacher-student interactions. The youths determined the outcome by their own behaviors. By exercising self-control they influenced their teachers and the assistant principal to provide attention for them. Their previous attitude of "having to give in" to the teacher was apparently replaced with a desire for self-discipline. With this procedure, the teachers were provided with a classroom management procedure which was consistent, clear and continuous, where the rules and limits did not have to be redefined daily for these youths.

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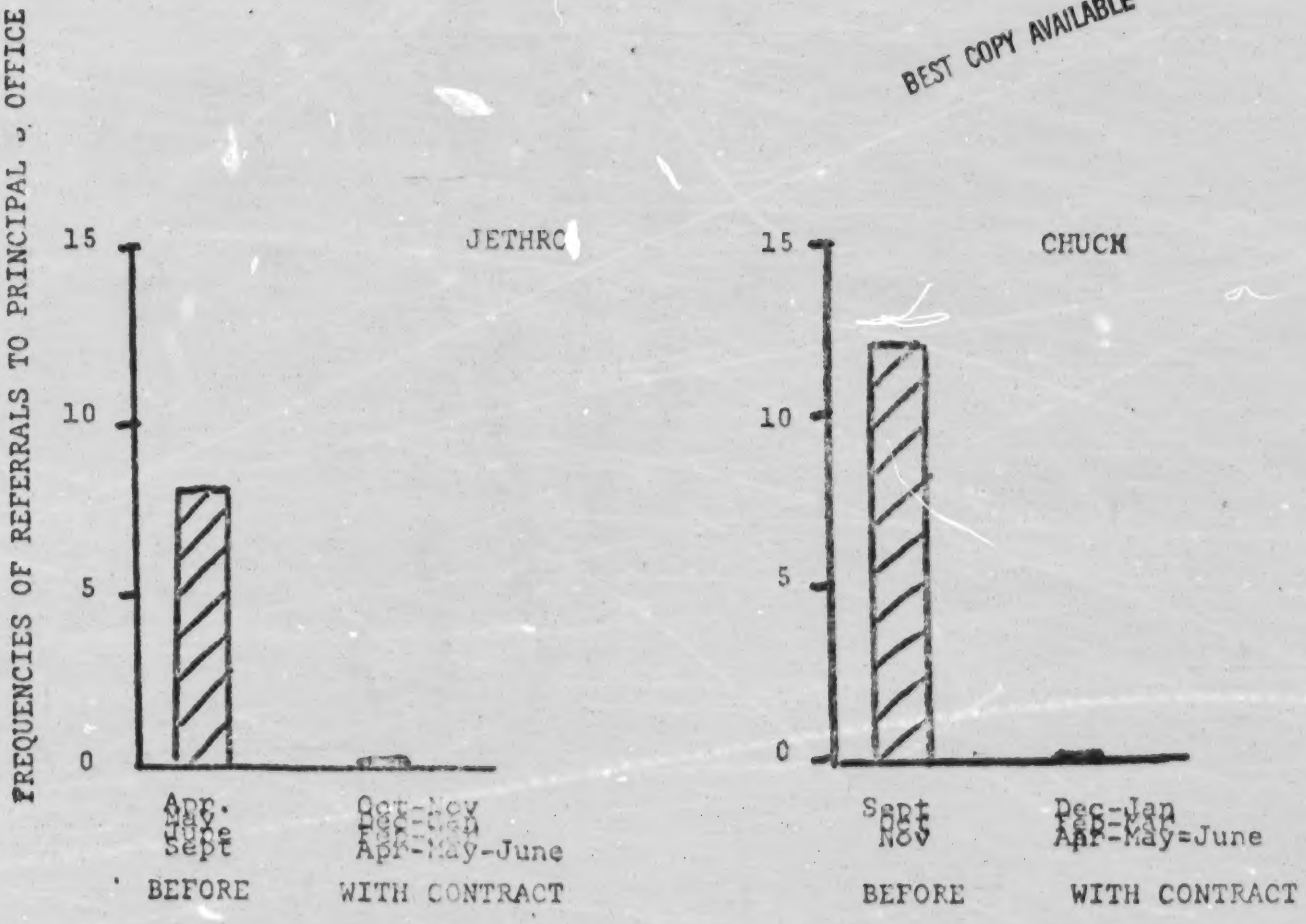

Fig. 2. The effect of contingency contracts on frequency of referrals to principal's office for disciplinary action for two junior high youths.

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CHITTENDEN CENTRAL SCHOOL DISTRICT

by

Dale Lanphear, Stanley Knapp, and Hollis Emery

Chittenden Central School District comprises the school districts of Essex Junction, Essex Town, and Westford. Within these three districts there are nine schools, approximately 4,000 students and a professional staff of approximately 275. Two of the district's schools have been involved in the Secondary Special Education Project: the Albert D. Lawton Intermediate School and the Essex Junction Educational Center (High School).

The Albert D. Lawton Intermediate School is Vermont's oldest middle school (opening in 1957). It provides early adolescent education for 545 sixth, seventh and eighth graders residing in the Incroporated Village of Essex Junction. Forty one classroom teachers, special area teachers and administrative personnel implement a broad program of academics, physical education, health, fine arts and atheletics. Divisioning of students is dual: homogeneous in the basic, subjects of English, math, reading and foreign language, and heterogeneous in social studies, science, industrial arts, music and art. Remedial and/or corrective sections are maintained at minimal enrollment and individualization dominates in the laboratory approach to mastery of basic skills.

The Essex Junction Educational Center, with an enrollment of approximately 1200, is comprised of local village students as well as tuition students from Colchester, Essex Town and Westford. The area vocational training program accommodates an additional 200 shared-time students from surrounding communities. The school

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prepares students for employment, military service, formal education in colleges or universities, technical and vocational institutes, apprenticeship programs, business schools, and other forms of training beyond the secondary school. For those with particular education needs, Diversified Occupations, remedial programs, and special options for the gifted, are provided.

The interest of Chittenden Central District in The Secondary Special Education Project is fundamentally based upon an abiding interest in collecting sound techniques that generate a positive response for students experiencing learning difficulties.

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"7I: THE CLASS OF 21"

7I or "7:Individualized" consisted of 21 seventh grade students who were chosen at random from homogenous seventh grade groupings. This provided a good cross section of students with all levels of achievement. However, approximately three fourths of the class had a learning deficit of at least one year in at least one subject area as demonstrated on the Iowa Achievement Test. Two of the students in the other remaining fourth of the class were discipline problems as reported by the principal and counselors. Thus, a total of eighteen of the twenty-one students were eligible for special education services as indicated by measures other than daily performance.

The twenty one students were assigned classes as a group in the basic subjects math, reading and English. They were not assigned to other subjects as a group.

Students in this class met daily for the following instructional periods, although the times for each period varied on a rotating schedule.

1st period: Math
2nd period: Reading
3rd period: Study Hall, Art
4th period: Physical Education
5th period: English
LUNCH
6th period: Study Hall
7th period: Social Studies
8th period: Science

Students were selected and placed in the class with parent permission and support. Other parent involvement included telephone calls to and from parents concerning student progress and procedures. Parent visits and other means of communicating were encouraged. Letters and questionaries concerning the effects of the project were

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given parents to prompt parent comments and questions. Parents were also encouraged to make suggestions concerning the development of individualized programs for their children.

Two formal programs were arranged by the teachers and consulting teachers to report to parents. These means of keeping open communications with parents were in addition to regular systematic school reports.

Opportunities for parents to respond resulted in referral of other siblings as well as comments such as:

"I would be very interested in the overall results of the entire group." ".. had the best report card grades he has ever had!! He would have his best marks at the first marking period, and coast or slip the rest of the year, previously!"

"I am still uncertain about the emotional effect of '7I'. I'm not sure I would or could go through the first few weeks,again."

Many positive statements were made by the parent: "My husband and I are very pleased with our child's progress this year. We have seen a big difference in his marks and his attitude." And another parent wrote, "I am extremely pleased with her progress this year, both in her academic work and attitude toward school and her friends." "...seems to be pleased with the progress also which is a big step."

The Effects of Immediate Correction on Improving Seventh Grade Arithmetic Performance

by

James Walford and Margritte Graves

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Student and Setting

Jim was a 13 year old boy in an average seventh grade class. In October of the school year he was not subtracting or adding at the 90% criterion level. He scored 7% correct on the minimum objectives achievement test as opposed to the expected 15%. The teacher was also concerned that Jim was performing below the 90% criterion on daily work.

Procedure

A daily thirty minute practice session was established within the 45 minute class period held from 8:30 to 9:30 a.m. All students were provided with teacher prepared materials.

Jim's worksheet for the first fifteen minutes contained ten 4-digit subtraction problems with regrouping. The second worksheet contained ten addition problems with 3 numbers and 4-digits with regrouping.

A timer was used to cue students to begin and end each 15 minute work session. If a student completed his practice sheet before the end of the 15 minute period, he sat quietly in his seat or read silently until the timer rang.

At the end of the first work period the students were given 2 minutes to stand and stretch. The same procedure was then followed for the second 15 minute work session.

The remaining 15 minutes of the class was used to work in math

books in any skills area chosen by the students, reading, or receiving extra help from peers or the teacher.

The teacher computed a percent of correct responses for each worksheet by dividing the number correct by 10, multiplied by 100. The percent of agreement between the teacher and the second observer was 100% on all products. Whenever there was some discrepancy in scoring, permanent products were observed until errors causing discrepancies were determined and 100% agreement was reached.

Baseline$_1$

During Baseline conditions, the teacher stood in the back of the room. He did not circulate among the students, give directions, praise or make eye contact with them. Concurrent measures were recorded for Jim in subtraction and addition.

Immediate Correction$_1$

During Immediate Correction, the teacher approached Jim's desk from 3-10 times each work period depending on whether Jim had completed a problem correctly. The teacher marked a "C" by each problem completed correctly. If the problem was incorrect, or if the student had not completed a problem, the teacher did not make any mark on the paper nor did he make any comment.

On session 15 as a result of measured increases on subtraction performance, and no concurrent increases for addition, Immediate Correction was introduced for addition.

Baseline$_2$

On session 18 Immediate Correction was removed for subtraction. The teacher no longer went to Jim to correct each problem completed. However, Immediate Correction was continued in addition until session 22.

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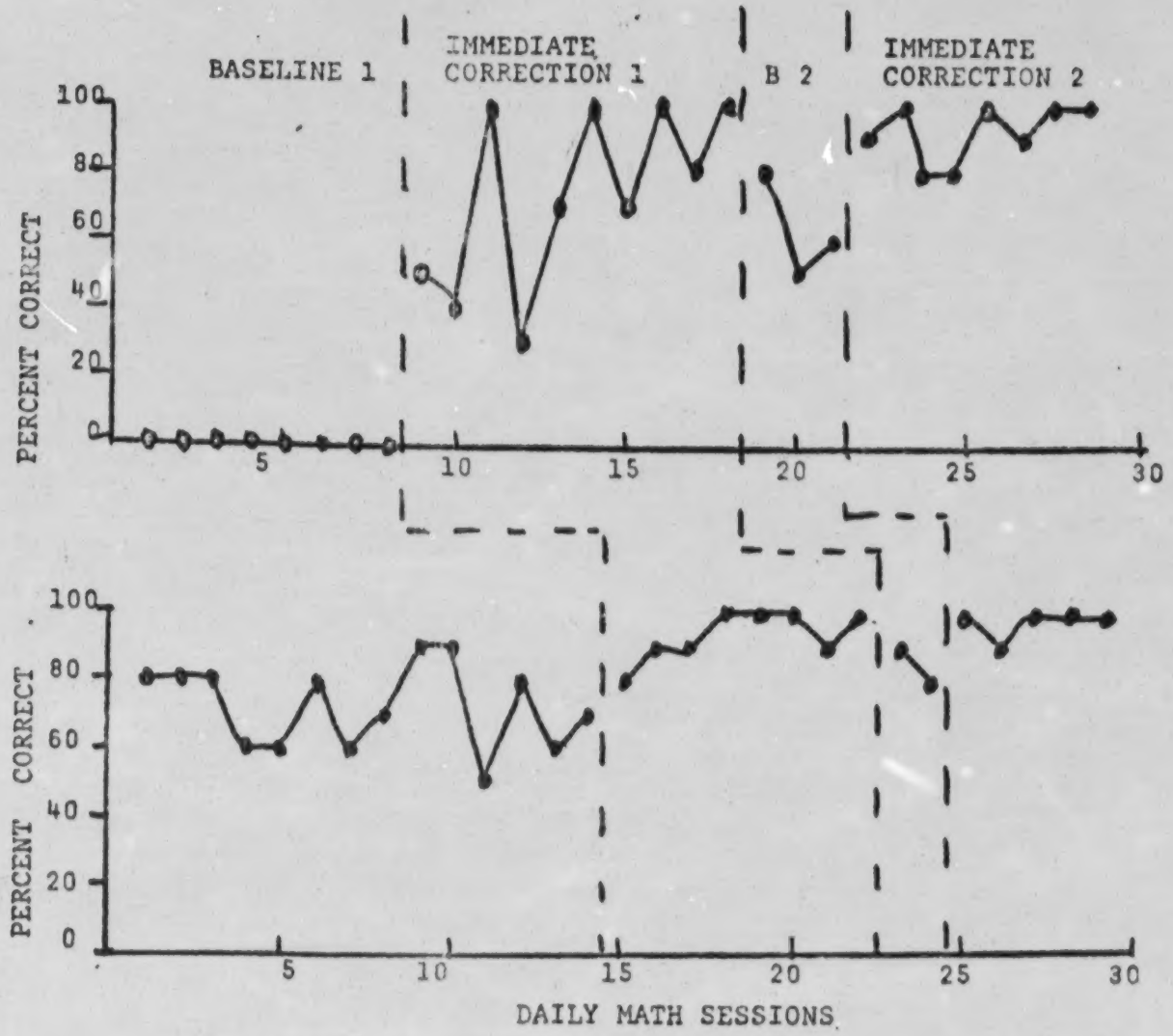

Fig. 1. The teacher's record of Jim's performance in subtraction(top graph) and addition(bottom graph) during each condition.

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Immediate Correction$_2$

The Immediate Correction procedures were reinstated in subtraction on session 22 and in addition on session 25.

Results

Figure 1 shows Jim's percent correct in subtraction and addition during each condition. For both skill areas, daily performance improved under Immediate Correction conditions when compared to Baseline performance.

Subtraction accuracy averaged 0% during Baseline$_1$, and 63% (rangine from 50%-80%) during Baseline$_2$.

During Immediate Correction, 1 and 2, subtraction accuracy averaged 71% (ranging from 30%-100%)and averaged 93% (ranging from 80%-100%) respectively.

Addition accuracy averaged 72% (rangine from 50%-90%) during Baseline$_1$ and 80% (ranging from 70%-90%) during Baseline$_2$. During Immediate Correction, 1 and 2, addition accuracy increased to an average of 94% (ranging from 80%-100%) and 98% (ranging from 90%-100%) respectively.

Concurrent minimum objective achievement scores increased from 7% to 24% during the period of this study. This improvement indicated that Jim was performing above the minimum expected rate of 23% for November.

Immediate Correction was used to increase the math responses of other students enrolled in this class. Although the procedure was not employed as systematically for those students as for Jim, it appeared to be an effective variable. Seventeen of the 21 students showed improvement on Achievement tests for Monthly Minimum Objectives.

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The Effects of Teacher-Led Discussions versus Independent Study on Written Comprehension of Written Assignments

by

Elizabeth Keene and Margritte Graves

Students and Setting

All students in the class were performing below the 85-100% criterion level for accuracy on daily work on reading materials at the seventh grade level. On the monthly minimum objectives achievement test 17 of the 21 students performed below the minimum rate required for achievement of grade level minimum objectives.

The reading class consisted of 21 seventh grade students enrolled in a public junior high school. The class met in the reading room of the school daily from 9:23 to 10:15. The average reading level of the class was 5.5 as indicated on the Iowa Achievement Test administed the previous year.

Instructional Objective

Given a reader and worksheets, each student will read as many stories as possible, and write the correct responses to vocabulary and comprehension questions that accompany each story with 85-100% correct written responses during the first 30 minutes of the class period.

Materials

The New Practice Readers, a basic skills reading series by McGraw-Hill and Co. (1962) was used. The readers consisted of 8 books

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that ranged from a reading level of 2.0 (Book A) to a maximum of 9.0 (Book H). Each story in the series had an average of 190 words in it as well as a two part written exercise(one in vocabulary and one in comprehension). The first part, vocabulary, was to be completed before reading the story. It consisted of new words that would be found in the story to be read and 6 sentences for using the new words. A Webster pocket dictionary was also provided each student.

The second part, comprehension, was completed after reading the story. It consisted of 6 comprehenstion questions about the story, (fill in the blank, multiple choice, etc.).

Daily Measurement and Reliability Procedures

A percent correct for each student was calculated on each set of written questions following a story by dividing the total number of questions written correctly by the total number of questions multiplied by 100.

An average percent correct achieved daily by each student was obtained on written responses to stories completed by adding the percent correct achieved on each set of stories and dividing by the total number of stories read multiplied by 100.

A class average percent correct was calculated by adding the individual averages and dividing by the number of students present.

Reliability of measurement was obtained when two observers scored the permanent written responses until 100% agreement was reached.

Baseline$_1$

At the beginning of each period the students entered the classroom,obtained their readers and worksheets, and sat down

to work at their desk. The teacher set an oven timer for 30 minutes after the first 3 minutes of the class period.

During the 30 minute work period, the students read silently and wrote the answers to questions that accompanied each story the teacher circulated among students.

When a student raised his hand, the teacher went to him and pronounced any words the student said he could not read and/or helped him to pronounce the word. At the end of the 30 minutes, the students handed in their folders and worked the rest of the period on other reading assignments.

The teacher scored the written responses and returned the papers to the students the following day.

Discussion$_1$

During this condition, the teacher chose stories no student had read. The teachers daily data sheet enabled her to determine the last story read by the student who had read the most stories. She then chose the next story in order of appearance. She directed the class to turn to that story. The students then volunteered to read aloud or were requested to do so by the teacher. When the students had completed reading the story, the teacher conducted a discussion session. She asked questions about the content, made comments about the content, encouraged students to make inferences and praised students for participating. The discussion session for each story following oral reading lasted about 5 minutes. The students completed the writing exercises that accompanied the story. The class then went on to read, discuss and complete written exercise on additional stories as time permitted. At least two stories were completed in this manner.

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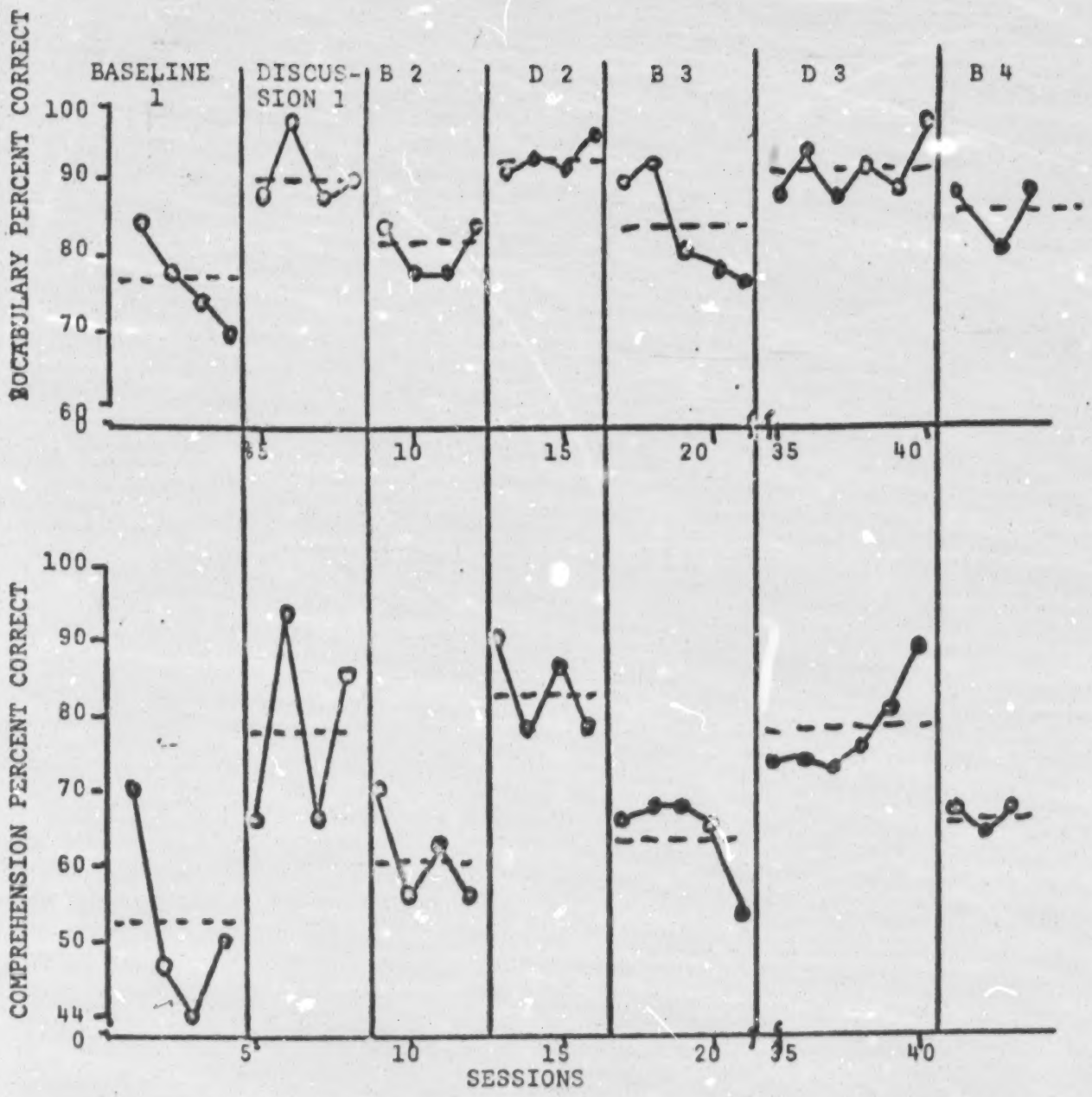

Fig. 1. The class average percent correct on vocabulary exercises (top graph) and comprehension exercises (bottom graph) during each condition. (Note: Between session 22 and 34, the teacher evaluated a token reinforcement system and another baseline condition.) The dotted lines indicate the average for each condition.

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Baseline$_2$

During the condition, the teacher no longer lead discussions. She returned to monitoring silent reading by circulating among the students to help students on request.

Discussion$_2$

Discussion procedures were reinstated.

Baseline$_3$

It was desireable to determine if the students would maintain the high level of reading accuracy with only silent reading, a skill essential to high school success. Thus, discussion procedures were removed and the students again read silently with the teacher circulating among the students.

Discussion$_3$

Discussions were again instituted for the class.

Students read stories only from Book 6, reading material equivalent to an eighth grade level.

Baseline$_4$

Discussions were removed. The students continued to work on 8th grade reading assignments.

Figure I shows the average percent correct achieved by the class on vocabulary and comprehension exercises during each Condition. The class appeared sensitive to discussions when compared to baseline performance.

Vocabulary accuracy during Discussion 1, 2, and 3 averaged 91%, 93% and 91%, respectively compared with averages of 77%, 82%, 84%, and 86% during Baseline 1, 2, 3, and 4, respectively.

Comprehension accuracy during discussion 1, 2, and 3 averaged 77%, 82%, and 77% respectively compared with 57%, 60%, 63% and 65% during Baseline 1, 2, 3, and 4, respectively.

THE EFFECTS OF GRADES AS TOKENS AND SURPRISE PACKAGES AS BACK-UP REINFORCERS ON IMPROVING DAILY ACCURACY IN ENGLISH

by

Norman Jodoin and Margritte Graves

Students and Setting

All students were performing below the 90-100% correct criterion level for daily work. On the monthly minimum objectives achievement test, 7 of the 21 students performed below the minimum criterion level.

This study was conducted in an average seventh grade English class with 21 pupils. The class met each day at 11:35 for 50 minutes. The students were expected to respond daily in at least one of the following areas on a rotating schedule:

1. In English 2200, a programmed English series, the students completed assigned frames.
2. In the Basal English Language Workbook, the students wrote the correct answers in blanks, corrected written passages, completed sentences and other writing tasks as directed.
3. In creative writing, the students wrote a minimum of 20 sentences about one of five topics listed on the board. Vocabulary exercises consisted of defining words, selecting correct words for sentences, identifying synonyms and antonyms, etc., by writing the correct responses.
4. In reference usage, the students completed worksheets with questions about reference sources, content, and usage.

Instructional Objective

Given a daily English assignment(s) in any one of the instruction areas	the student will write responses to the assignment	with 90-100% correct.

Procedures

Data was obtained each session on the percent correct achieved for each student by dividing the total number of correct responses by the total number assigned, multiplied by 100. The mean percent correct achieved by the class was computed by summing all the students' percentages and dividing by the number of students. Reliability was obtained when two observers scored the permanent products until 100% agreement was reached.

At the beginning of the period, each student obtained his individual work folder from the file, went to his seat and began to work. At his seat, he graphed his percent correct for the previous day's work. The teacher circulated around the classroom to correct completed papers. Work that remained uncorrected at the end of the period was collected by the teacher to be corrected and returned by the next day.

Baseline$_1$

During this condition the teacher frequently praised the students for accurate responses and frequently reminded those who did not improve to "buckle down" and "do better." No other intervention procedures were employed.

Token System$_1$

During this condition, small brown bags of assorted school supplies were prepared as surprise packages. Items included pencils,

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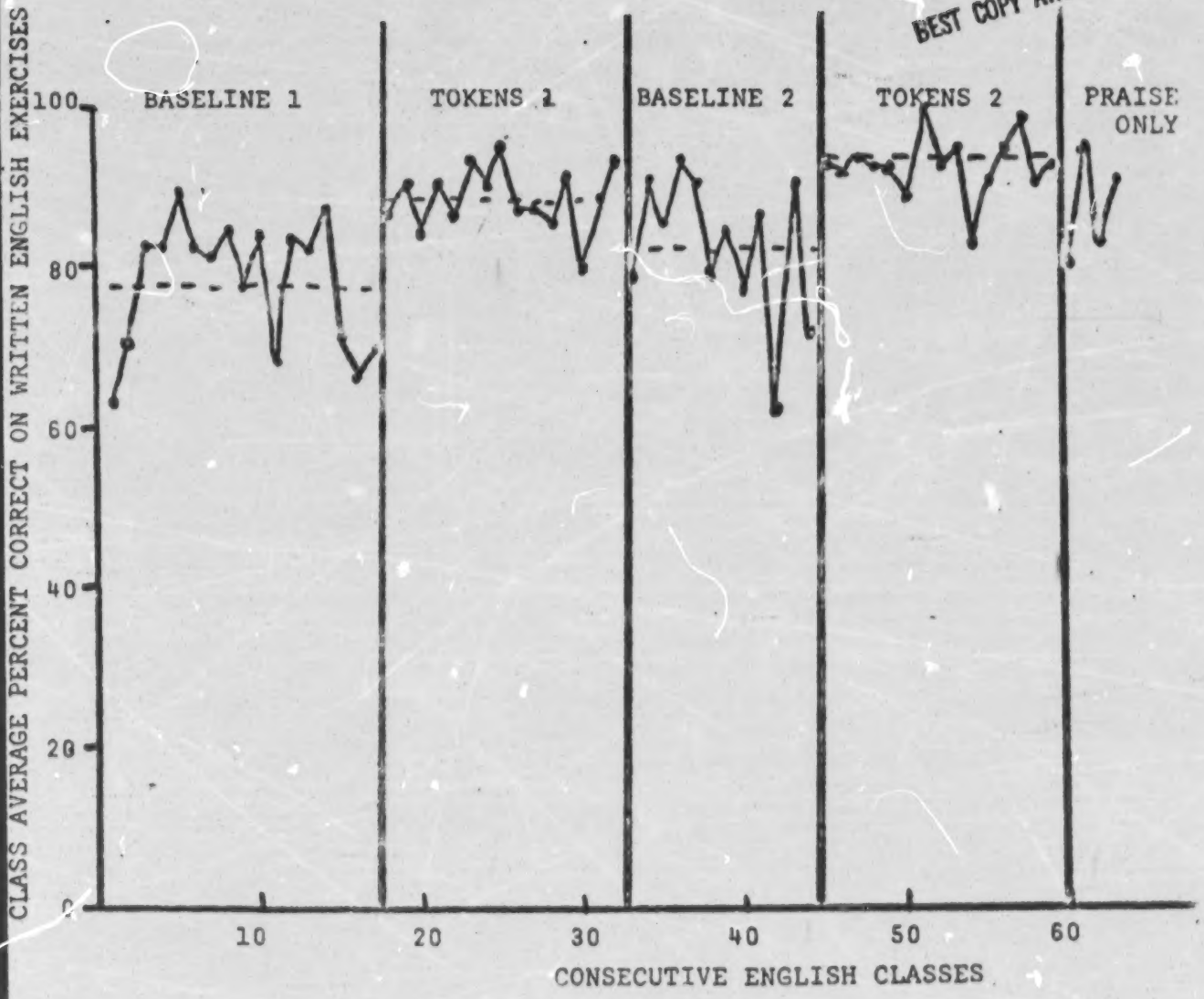

Fig. 1. The teacher's record of the average performance for the whole class during each condition. The dotted line indicates the average for each condition.

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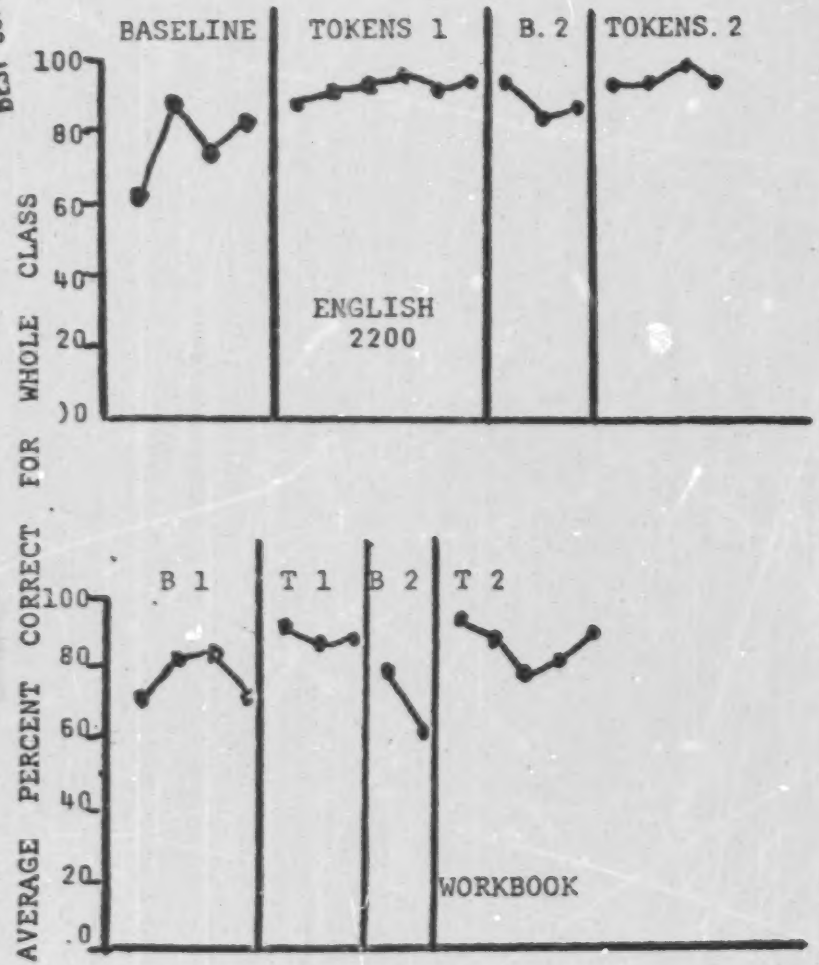

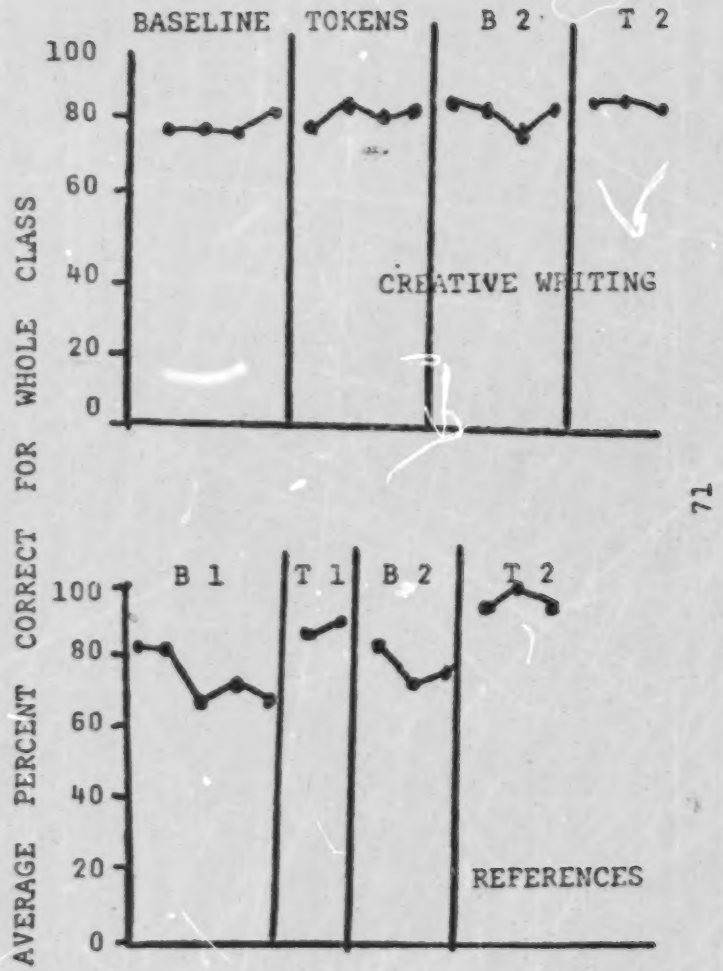

Fig. 2. The average performance on each assignment area during each condition.

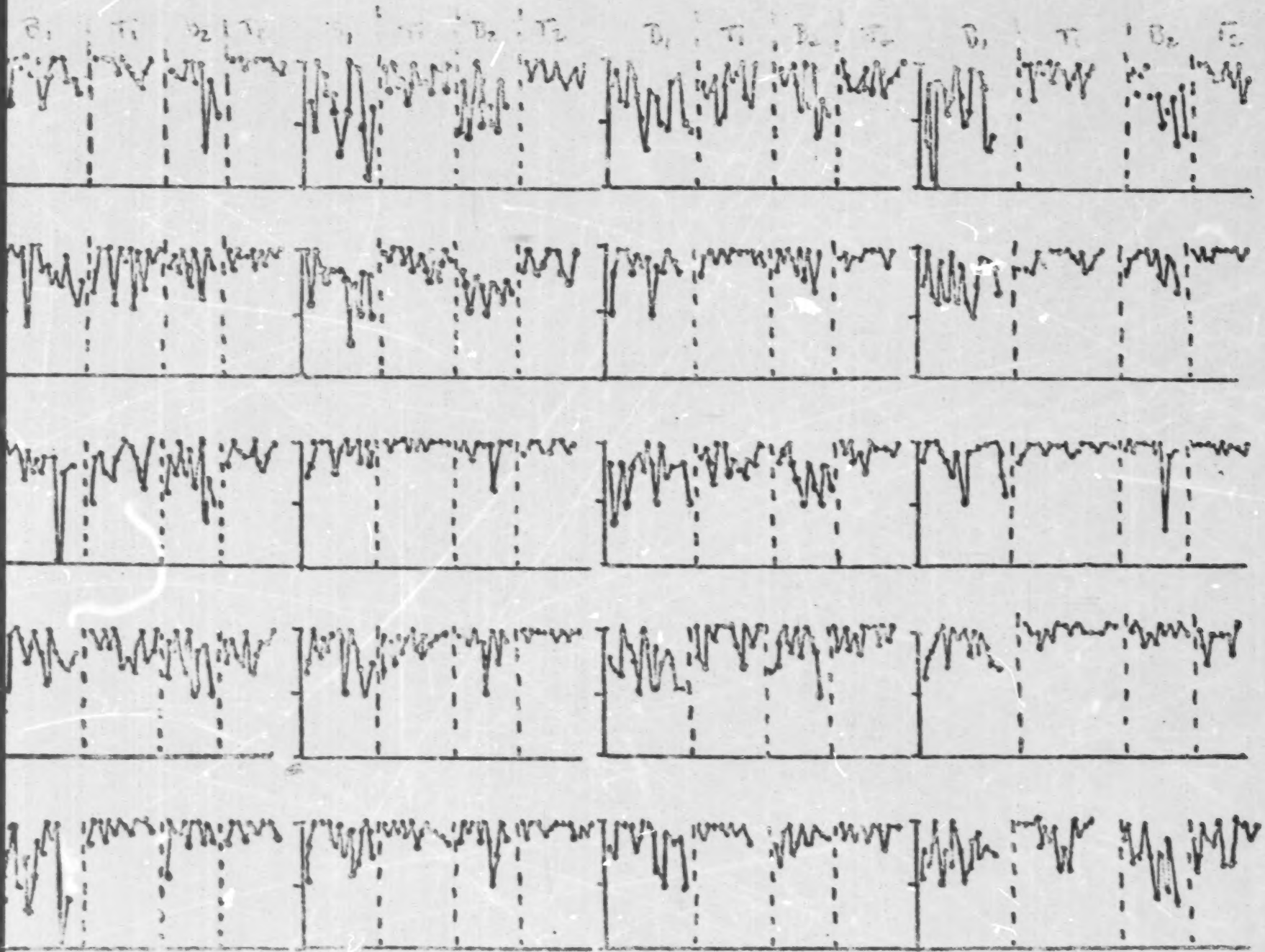

Fig. 5. Each student's daily performance during each condition.

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crayons, small pads, magic markers, 6 inch rulers, blank sheets of paper, etc. For one of the 21 packages, a bonus prize of an ice cream ticket was included.

At the beginning of each period as soon as the students were seated, the teacher read the names and the scores of students who had achieved 80-100% correct on the previous day's work, praised him and said, "You may select from the treasure chest, Johnny." Those students who did not achieve 80-100% received their papers with no comments from the teacher.

When this procedure was completed, the students obtained their folders and began to work. The teacher continued to circulate, work with students in groups, make new assignments, and correct completed work.

Baseline$_2$

The teacher removed the surprise packages and returned to Baseline procedures.

Token System$_2$

The teacher reinstated surprise packages contingent on 80-100% correct on daily English assignments.

Result

Figure 1 shows the average accuracy for the English class during each condition. Figure 2 shows the average accuracy for the class on each assignment area and Figure 3 shows each student's daily accuracy.

During baseline the class averaged 78% correct, during contingent surprise packages the class averaged 88% correct, during return to baseline phase (Kennie's average excluded in sessions 32-50) the class

averaged 82% correct and after the surprise packages were reinstituted the class averaged 93% correct.

Figure 1 depicts the class average during each condition and Figure 2 shows the class performance in each assignment area. Figure 3 depicts the individual results for 20 students. Correctly written English responses of 20 of the 21 students appeared to be sensitive to contingent surprise packages contingent on 80-100% correct written responses in English.

Although surprise packages appeared to be a powerful reinforcer for these 20 seventh grade students, one student increased his response rate very little when that stimulus was presented, as shown in Figure 4.

The teacher developed the following program to further individualize instruction for Kennie on session 32.

Baseline$_2$: The teacher first returned to baseline procedures where Kennie scored 18% correct and incompleted his assignment.

Surprise Packages and Early Dismissal for Lunch: The teacher implemented a procedure for Kennie where he received 3 minutes of time before the lunch bell and surprise packages.

Baseline$_3$: Surprise packages and early lunch time were removed.

Surprise packages and Early Dismissal: Surprise packages and early lunch time were reinstituted.

Results: The results are demonstrated in Fig. 4 which depicts the average percent correct written responses to English achieved by Kennie during each condition.

Surprise packages were gradually removed for all students. Each student continued to be informed of the previous day's performance

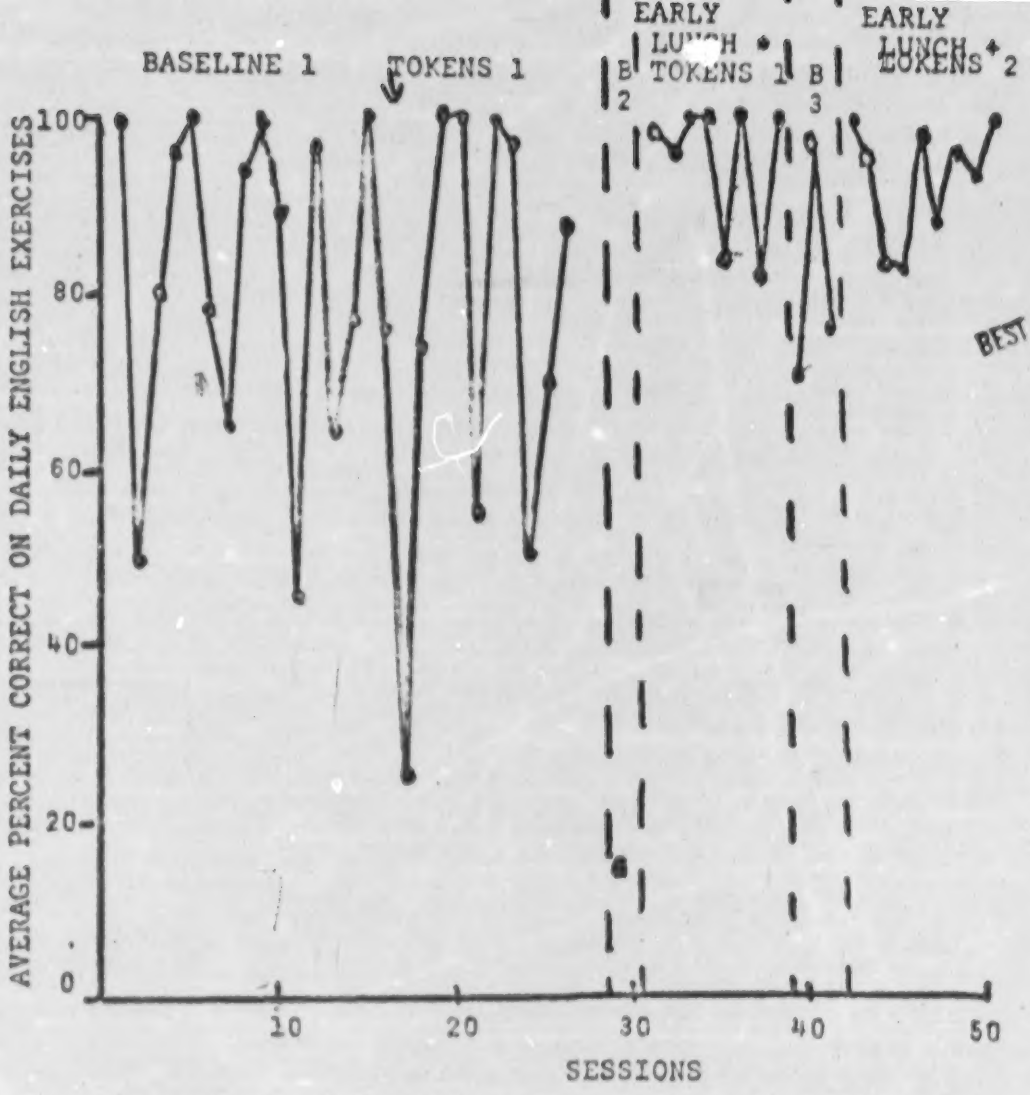

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Fig. 4. Kennie's daily average percent correct on written English exercises during each condition.

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daily with teacher praise contingent on achievement of 80-100% correctly written English responses.

Discussion

This study demonstrates the effects of surprise packages on increasing correct English responses in a seventh grade class. When surprise packages were made contingent on a higher rate of correct English responses, correct English responses increased.

Although surprise packages did not effectively increase correct response for one of the 21 students, the token system (grades exchangeable for surprise packages) was easily adapted for a more effective back-up reinforcer (early lunch time) for this student.

At the termination, when surprise packages were removed and contingent praise was maintained, the students were responding at a higher percentage accuracy than baseline condition, even though the responses required during contingent praise were more complex than in other phases of the study.

Increasing Appropriate Study Hall Behaviors Through Systematic Application of Learning Theory

by

Oliver Gardner and Margritte Graves

Learners and Environment

This study was conducted in an average seventh grade class study period with 21 students. The study period was held each day at 2:15 p.m. for 50 minutes. These students were referred for engaging in one or more of the following inappropriate behaviors: Not attending to study assignments (ex. not face oriented toward study assignments); physical negative aggressiveness (ex. throwing objects at persons or things, hitting, slapping, or kicking persons or things); distructiveness (ex. breaking pencils, ripping paper or pages, writing on desks or other furniture); noisy (ex. talking loudly, yelling, banging books, scraping chairs and any sounds that are disruptive to others); non-compliance (ex. student does not follow directions, do what is requested, or does not comply); in-appropriate interactions (ex. name calling, "back talking", looking at others during study time, teaching others during study time); inappropriate locale (ex. leaving study areas without permission; self-stimulation (ex. banging head, hands or feet, kicking desks or chairs, sucking hands or clothes).

Instructional Objective

Given homework assignments from the Reading for Concepts series (Webster, McGraw Hill, 1971), students will complete their homework

assignments in reading during the study hall. To aid the students in meeting this objective the following enabling objective was derived:

For 24-30 minutes of the study hall, all students will engage in appropriate study behavior (defined as being face oriented toward study assignments and not looking away for more than 3 seconds during any time sampling, and/or wirting academic responses, while not emitting any of the inappropriates listed above).

Procedure

The first 15 minutes of each study period was to be used by the students to complete reading homework. The students were expected to read a minimum of two stories and write the correct written responses to the stories. The remainder of the study period was to be used by the students to complete English and Math homework. All students were expected to engage in appropriate study behavior during the entire 50 minute period.

Measurement and Reliability Procedures

A time sampling procedure was used to determine the percent of appropriate study behavior for the class. During the first 30 minutes the teacher observed the class for appropriate study behavior at the end of ten 3 minute intervals. If all students were engaged in appropriate study behaviors and no student was engaged in inappropriate study behaviors, the teacher recorded "+" at the end of the time sample. If one or more students were engaged in inappropriate study behavior at the end of the 3 minute interval, the teacher recorded "0". (See sample data sheet in Figure 1)

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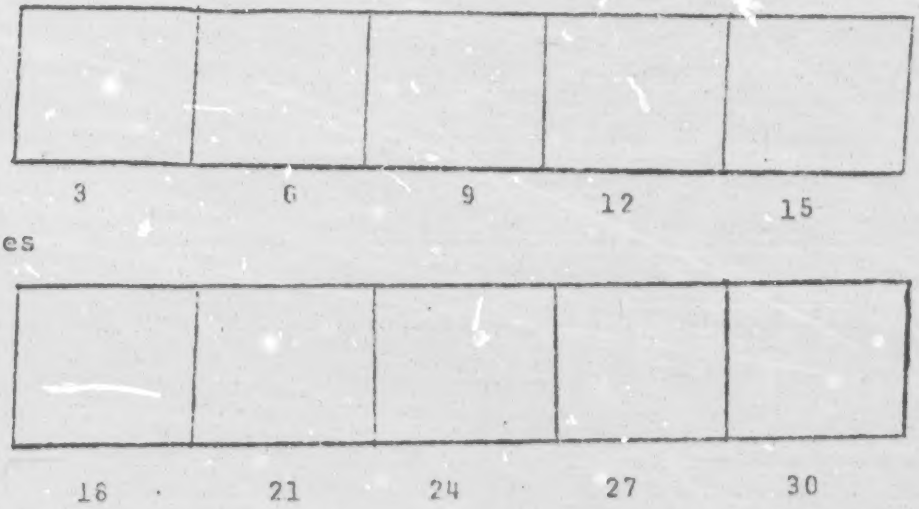
Score "+" at the end of each three minutes for appropriate study behaviors. Score "0" at the end of each three minutes for inappropriate study behavior.



Teacher _____

Class _____ Room _____

Date _____ Time _____

% Attending	Observer	observer reliability
_____	_____	_____

Figure 1

A sample data sheet used to record appropriate study behavior.

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A percent of appropriate study behavior was determined by dividing the number of "+'s" by 10 (the total number samplings) and multiplying by 100.

Reliability of measurement was obtained by a second observer who recorded the class behavior simultaneous with the teacher. Time sampling intervals were then matched. The total number of intervals with agreement between observers was divided by the 10 total samplings and multiplied by 100 to obtain a percentage of agreement. Reliability of measurement was determined a minimum of twice during each condition and averaged 99% ranging from 90-100 percent.

Baseline$_1$

During this condition the teacher and second observer recorded the class study behavior at the end of each of ten 3 minute intervals.

Contingency$_1$

During this condition the teacher told the students that he was recording appropriate class study behavior. He drew 10 squares on the board and demonstrated how appropriate and inappropriate class study behavior was being recorded. He told them they could earn game time, movies and field trips any day the class was observed engaging in appropriate study behavior 80% of the first 30 minutes of the study period. These plusses would be exchangeable for games, movies, and field trips.

At the end of each class period the teacher computed and recorded on the blackboard the percentage for appropriate study behavior achieved during that session.

Baseline$_2$

The students no longer earned game times, movies or field trips contingent on appropriate study behavior. The teacher continued to record the percentage of attending on the blackboard at the end of the period.

Contingency$_2$

The teacher told the students they could earn a field trip contingent on their achieving appropriate class study behavior. He continued to record on the blackboard at the end of each session, the percentage of attending achieved by the class.

Results

During baseline$_1$ all inappropriate behaviors listed were engaged in and 0% appropriate study behavior was emitted.

During contingent games, movies and field trips the students achieved an average of 20% appropriate study behavior ranging from 0 to 60%. A movie was presented following their achievement of 60%.

A removal of contingent games, movies, and field trips resulted in a return to 0% appropriate study behavior.

Reinstatement of free game time, movies and field trips resulted in an increase of appropriate study behavior to 76% ranging from 60% to 90%. Reliability was 99%.

Discussion

This study demonstrated contingent games, movies, and field trips increased appropriate study behaviors in seventh graders.

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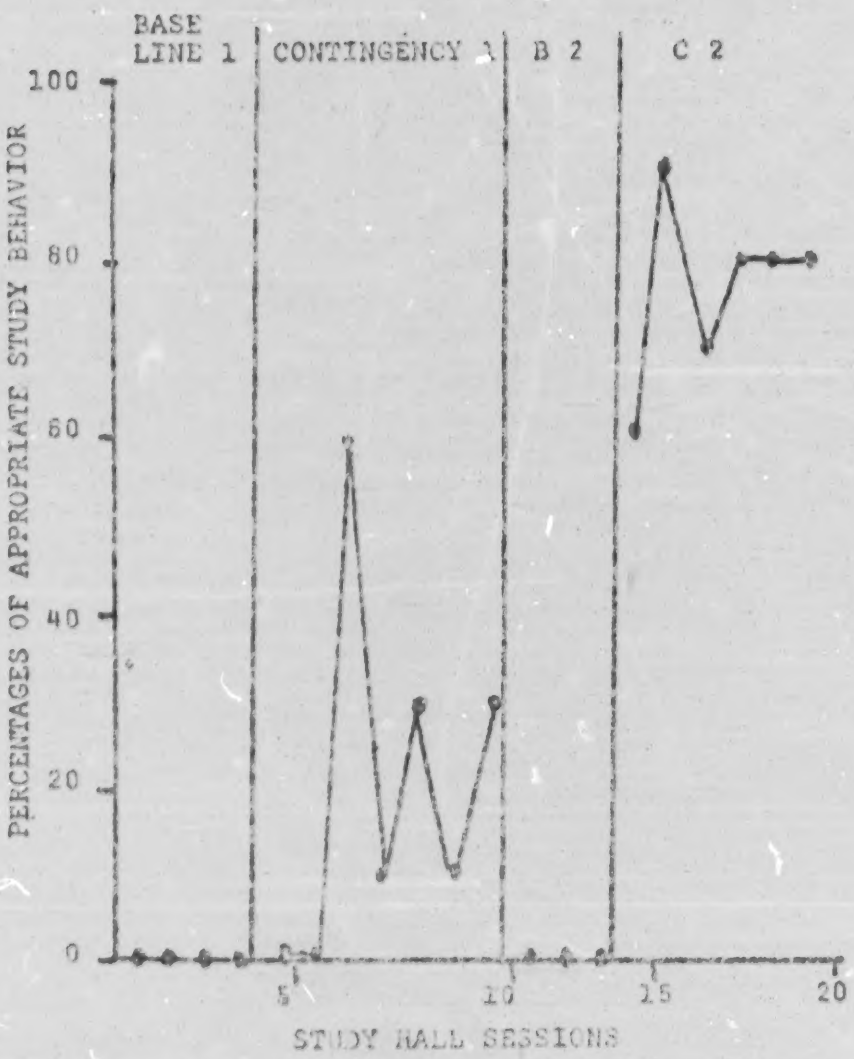

Fig. 2. The teacher's record of study behavior for the whole class during each condition.

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Although the data system was not sensitive enough to illustrate the many changes observed in individual students, the whole class did prove sensitive to the contingencies. They no longer screamed to the teacher, but raised their hands to approach the desk. On one occasion, another teacher in the school entered the room during contingency and inquired, "Is this a class?" (i.e., Implying that such studious behavior was not typical of a study hall.)

The study hall teacher described a particularly impressive change in one student who had never knocked when entering the room during class but had always jerked the door open and slammed it. This student stopped slamming the door the first day of procedures and began knocking before entering the classroom!

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Private Time with Mother as an Incentive for Increasing Reading Performance for a Seventh Grade Girl

by

Gretchen Nichol and Margritte Graves

Student and Setting

Diane was a seventh grade girl enrolled in a seventh grade remedial reading class. At referral, she was reading in a 3.5 basic skills reader and averaged 0% correct. On the Gates MacGinitie diagnostic reading test she scored a 3.7 grade equivalent for reading.

Instructional Objective

Given a 7th grade reader the student will read at least 1 story each session and complete the written exercises to the story within the first fifteen minutes of the class with 90-100% correct.

Materials

Readers from the Readers Digest Series by the Readers Digest Services, Inc., 1971 were used.

Daily Measurement and Reliability Procedures

During the first 15 minutes of the class the student read one story (consecutive readings). The student wrote responses to the exercises at the end of the story. When she did not recognize a word, she raised her hand and the teacher went to her to pronounce the word.

When written responses were completed, or at the end of the 15 minutes, the student placed the work on the teacher's desk. The

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remaining class time was used to work on other reading assignments.

The teacher corrected the student's responses and computed a percentage correct on each questionnaire after class was dismissed. Percent correct for each set of questions was calculated by dividing the number correct by the total number of questions, multiplied by 100. The percent of agreement between the teacher and the second observer was 100% on all products. Whenever there was some discrepancy in scoring permanent products, the products were rescored until agreement was reached. The corrected work was returned to the student the next day.

Teaching/Learning Procedures

Baseline$_1$: The teacher gave the student the reader and worksheet and left her to complete the reading assignment.

Home consequences$_1$: The teacher returned Diane's paper the following day. She praised her for performances higher than the mean score achieved over the three consecutive days prior to that day's achievement. She then presented to Diane a card to take home (see Figure 1).

Mr. & Mrs. Parent

This is to inform you Diane

Achieved "A" level work today.

Mrs. Nichol

Fig. 1 This card was presented to Diane contingent on achieving a score higher than the mean score achieved for the 3 prior consecutive days.

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Diane took the card home each day it was presented to her and exchanged it for 15 minutes of free time to do special projects such as sewing, cooking, planting, etc. with her mother.

These conditions were repeated (Baseline$_2$ and Home Consequences$_2$) in order to evaluate the effects of the procedures.

Results

Figure 2 depicts Diane's performance during each condition.

During Baseline$_1$ Diane's accuracy averaged 36% ranging from 0 to 64%.

During Home Consequences$_1$ she averaged 62% ranging from 56% to 74%.

During Baseline$_2$ Diane returned to a low accuracy of 43% ranging from 42% to 44%.

During Home Consequences$_2$ she returned to a higher accuracy, averaging 70% with a range from 50% to 86%. Diane achieved the criterion of the instructional objective on two occasions. She progressed from a 6.1 reader to a 7.1 reader under contingent home consequences.

Discussion

At referral time, Diane was receiving reading assignments in a 3.5 grade level reader. She often did not attend to her reader or complete assignments and was, therefore, averaging 0% correct. Once the daily reading sessions were initiated she immediately began progressing not only on daily assignments but also through more difficult materials.

However, her acceleration rate did not appear to increase enough

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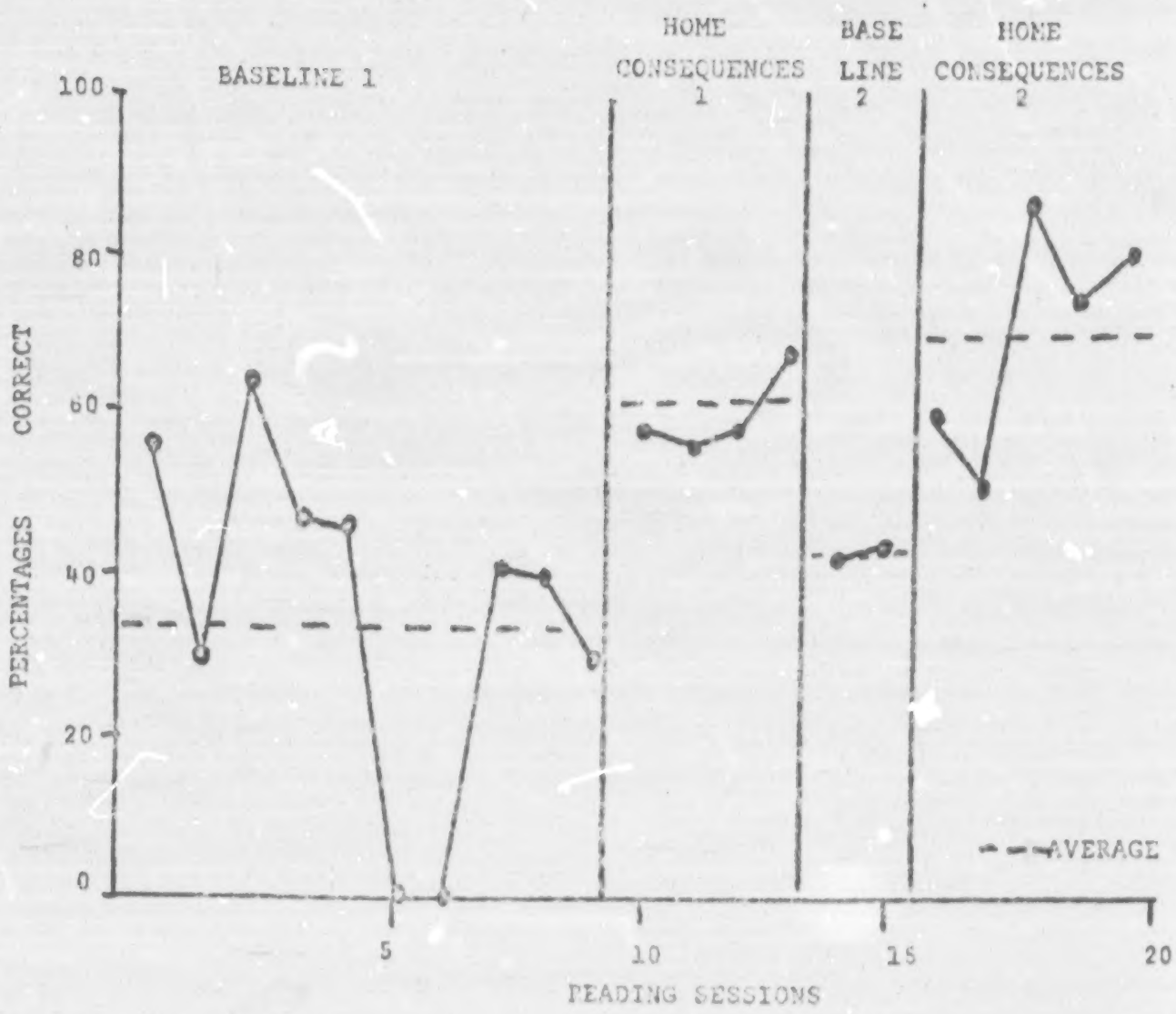

Fig. 2. The teacher's record of Diane's percentages correct on written responses to reading during each condition.

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to reach grade level criteria within the school year. Her daily performance had stabilized; therefore contingent parent consequences were instituted. During this condition Diane's frequency of achieving correct responses increased.

This study demonstrates that parents can effectively manage contingencies for academic achievement when the teacher and parents arrange for student progress through a simple, systematic procedure.

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A Multiple Baseline Analysis of a Token System on Reading Comprehension

by

Kathleen Sprout and Margritte Graves

Students and Setting

Three students (Mike, Jim and Keith) were functioning below the daily minimum objective of 80% correct on daily reading assignments. They were also functioning below grade level on the monthly achievement tests as well as on standarized achievement tests. They were enrolled in a 7th grade remedial reading class of 10 seventh graders (8 boys- 2 girls): four repeated at least one grade, and all of them had learning problems which had been diagnosed and remediated to varying degrees by personnel both within and out of the school system. The class had reading five days a week in a . Lab setting which exposed them to various reading activities during the 43 minutes of class.

Mike was 15 years old and large for his age. He was the biggest in the class. He had scored an IQ of 68 on the Otis test and scored 4.3 in reading on the Iowa Achievement test.

Jim was 14 years old and a small boy for his age. He had scored an IQ of 94 on the Otis Test. His main interest was in crawling-living animals and insects. He was a likeable boy, good natured and willing to cooperate.

Keith was 13 years old and was of average size for his age. He scored an IQ of 94 on the Otis test and scored 2.6 in reading on the Iowa Achievement test.

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The students were expected to be able to call out correctly a list of words taken from the assigned reading within 3 seconds of being presented the word. They were expected to do some leisure reading and to be able to demonstrate understanding of such material by writing a paragraph of not less than five complete sentences, including the main idea and several supporting details. This skill of reporting accurately was also to be demonstrated in a research project, on a project of their choosing, within a six week period.

Instructional Objective

Given a reading assignment the students were expected to achieve an average of 80% correct written responses daily.

Daily Measurement and Reliability Procedures

Given the material described, Mike and Jim were expected to achieve 80% correct written response on fourth grade material. Keith was to achieve 80% correct on 3rd grade material. Percent correct was determined by adding the total correct responses, dividing by the total assigned, and multiplying by 100. Reliability was determined by two independant observers observing the permanent product until 100% agreement was achieved.

Teaching/Learning Procedures

Baseline$_1$

During this period, a multiple baseline design across subjects was employed in this study along with intra subject verification by reversal. The students worked independently with a variable amount of teacher attention. Completed materials were placed in folders, corrected, and returned the following day.

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Concurrent baseline measures were taken for all three students through session 16.

Contingency$_1$

On session 17 a token system was implemented for Mike while concurrent baseline measures continued for Jim and Keith.

Under the token system small articles could be selected from a box contingent upon receiving a token (a round blue dot glued to the paper with the previous day's work on it and the per cent correct indicated). One (1) point of improvement over the mean % correct for the 3 days prior to each day was required to earn the dot.

On day 18 the token system implemented for Mike was also implemented for Jim while baseline measures continued for Keith.

Baseline$_2$

During this condition, tokens were removed for Mike on day 20, and removed for Jim on day 21. Baseline$_1$ continued for Keith.

Contingency$_2$

During this condition the token system was reinstituted for Jim on day 23, and reinstituted for Mike on day 24.

Baseline measures were continued for Keith during sessions 1-23. On day 24 contingent tokens were implemented for him.

Results

During baseline$_1$ Mike's percent correct on daily reading ranged from 0-95% correct with an average of 52%. During contingent token Mike's percent correct ranged from 65-85% correct and averaged 73%. During baseline$_2$ his percent correct ranged from 30-50% correct and averaged 38%. When tokens were reinstituted his percent correct

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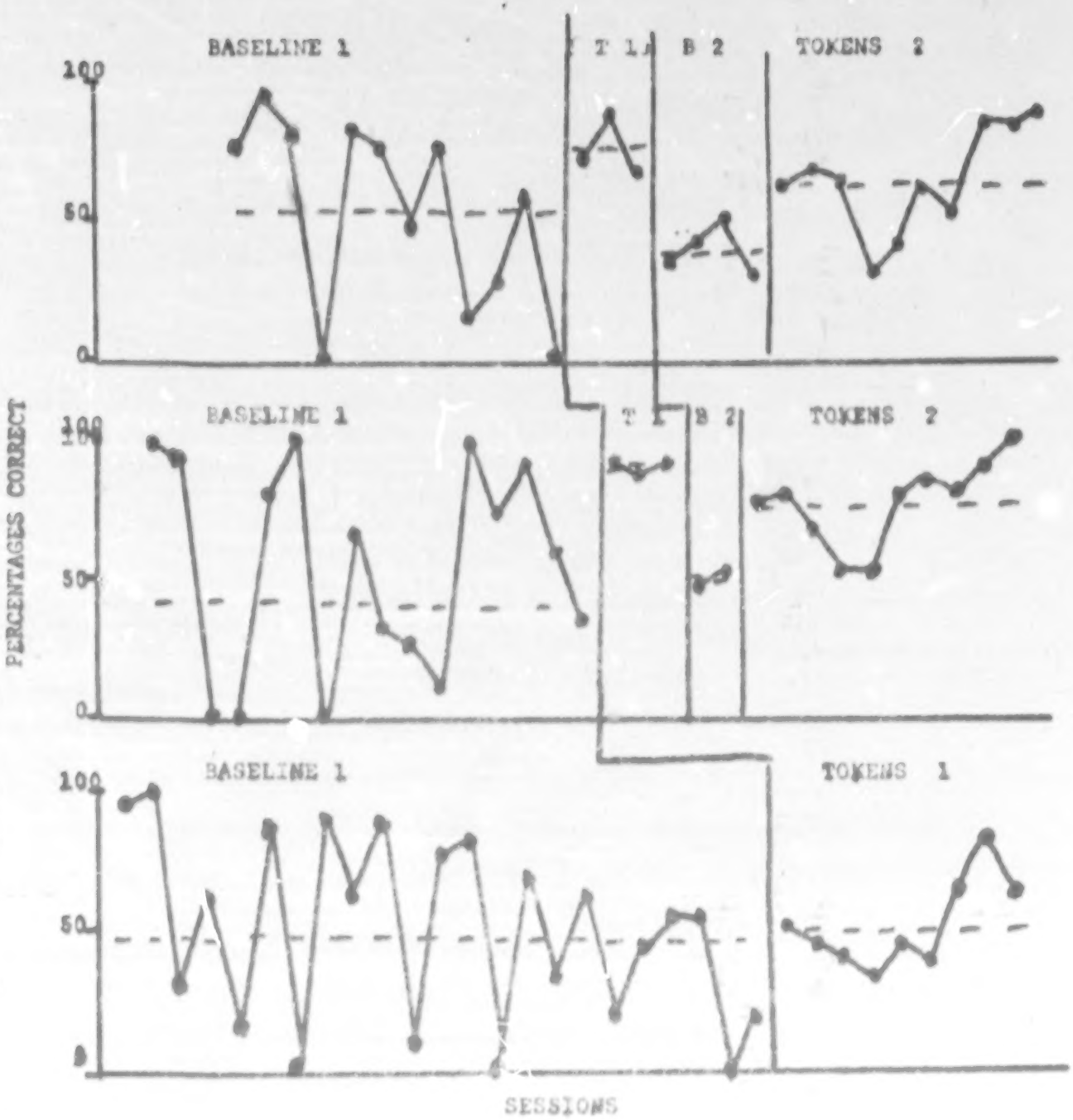

Fig. 1. The teacher's record of written responses to daily reading exercises for Mike (top), Jim (middle), and Keith (bottom) during each condition. The dotted line indicates the average for each condition.

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ranged from 30-86% and averaged 62%.

During baseline$_1$ and$_2$, Jim's accuracy on daily reading assignments averaged 40% (ranging from 0% to 100%) and 50% (ranging from 48-51%)respectively. During the token conditions, Jim's reading scores improved to an average of 88% and 74%, respectively.

During baseline$_1$ Keith's percent correct in reading ranged from 0%-100% and averaged 49%. During contingent tokens Keith's percent correct in reading ranged from 35%-80% and averaged 50%.

Discussion

Each students attitude changed considerably during the teacher/learning procedure described. For example, before intervention procedures, Jim consistantly asked to fill in the answers only when the teacher had read the material for him. If he told the teacher the answers, he would ask the teacher to write it down, thus showing that he was depending almost totally upon his listening and speaking skills and not developing his reading and writing skills at an appropriate rate. After intervention procedure, when he was required to do only one better than the previous day, he was able to increase his performance from that success level and he began working from there.

The social behavior of the youths improved when they began to do better each day. They learned to select their own materials, to begin their assigned activities and to work toward successful completion of their assignments. They learned to ask for help only when they had tried to succeed alone. They were not often frustrated when they were unable to perform at a high rate.

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Making a small gain daily, or building on the previous days success, seemed to be quite rewarding for them.

The strength of such a teaching/learning procedure is the security for the student in knowing the exact procedure and being able to see a measure of success each day.

Some gain in academic performance levels for the student are shown. These gains illustrated by the graphs might have become daily reinforcers for the student. The daily opportunity for the student to see what he had accomplished, to know precisely what is required for [illegible] day, and to have a goal to work toward are invaluable. To know that desirable behaviors are possible, and that personal gains are to be rewarded are all extremely valuable lessons for students. The fact that all the students in the group increased their achievement is evidence that such a procedure has value.

The weakness of such a procedure lies in the reinforcing of only three students. Also, it was unfortunate that the study did not continue long enough to see if the behaviors would maintain without being reinforced.

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Contingent Counselor Praise and Pupil Progress

by

Patrick Stanton and Margritte Graves

Student and Setting

David was a 13 year old boy with above average ability as observed from IQ test results, achievement tests and report card grades. He was the only boy in the family.

He was one of 21 students in a regular 7th grade class. The class had been carefully selected to ensure a wide range of levels in areas of Reading, English, math, and social behaviors. The class attended eight 40 minute periods per day. He was missing a number of school activities and lessons because he would leave study hall or get excused from a class to come to the counselor to complain.

Minimum Objective

Given school time Dave will make positive verbal responses toward school and the environment and will not make negative verbal responses about school and the environment at any time.

Measurement and Reliability Procedures

On a data sheet (shown on the following page) the counselor tallied the number of negative and positive comments that Dave made in the counselor's presence. The check used for tallying listed negative comments Dave had frequently made during sessions with the counselor. It also contained a list of positive comments desired.

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Date_____
Student_____
Period_____

Tally Here

NEGATIVE COMMENTS:

____1. Want to get out of the class.
____2. Not happy with section.
____3. Not doing anything.
____4. Work is boring.
____5. No friends in that class.
____6. Friends in another section.
____7. Destroy property.
____8. Interfering with personal property.
____9. Don't like the teacher.
____10. Teacher made me mad.
____11. Had to stay after.
____12. Work is too hard.

Write other negative comments here:

POSITIVE COMMENTS:

____1. Like the class.
____2. Doing better now.
____3. Enjoy teachers.
____4. Didn't get into trouble.
____5. Made a good score.
____6. Parents pleased with school progress.
____7. Work is easy.
____8. Like people in the class.
____9. Administrator and/or administrators happy with no trouble.
____10. Administrator and/or administrators happy with grade I made.

Write other positive comments here:

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Reliability was determined when an independent observer tallied the number of negative and positive comments that Dave made about his school or environment in the counselor's presence.

Teaching/Learning Procedure

Baseline: The counselor merely tallied the number of comments while continuing to converse with David about his problems.

Contingency: The counselor praised Dave for positive comments, Praised him for high academic scores achieved, and ignored negative comments. The counselor removed himself from the presence of the student when no positive comments were made. For example, when David said, "I have no friends in this class," the counselor excused himself by saying, "Sorry Dave, I have to run now." When David said, "Today I got a 70 on math," the counselor said, "You know, your math teacher mentioned that to me. He's quite pleased with your progress!"

Results

During baseline, negative responses ranged from 8 to 19 with an average of 14 per session with the counselor. The positive responses ranged from 1 to 4 with an average of 1 per session with the counselor. During contingency conditions the negative decreased to a range of 0 to 14 with an average of 3 per session with the counselor. Positive responses increased to a range of 3 to 8 with an average of 4 per session with the counselor.

Discussion

The study was far too short to be able to say positively that the procedure would have had long range effects. However, it did

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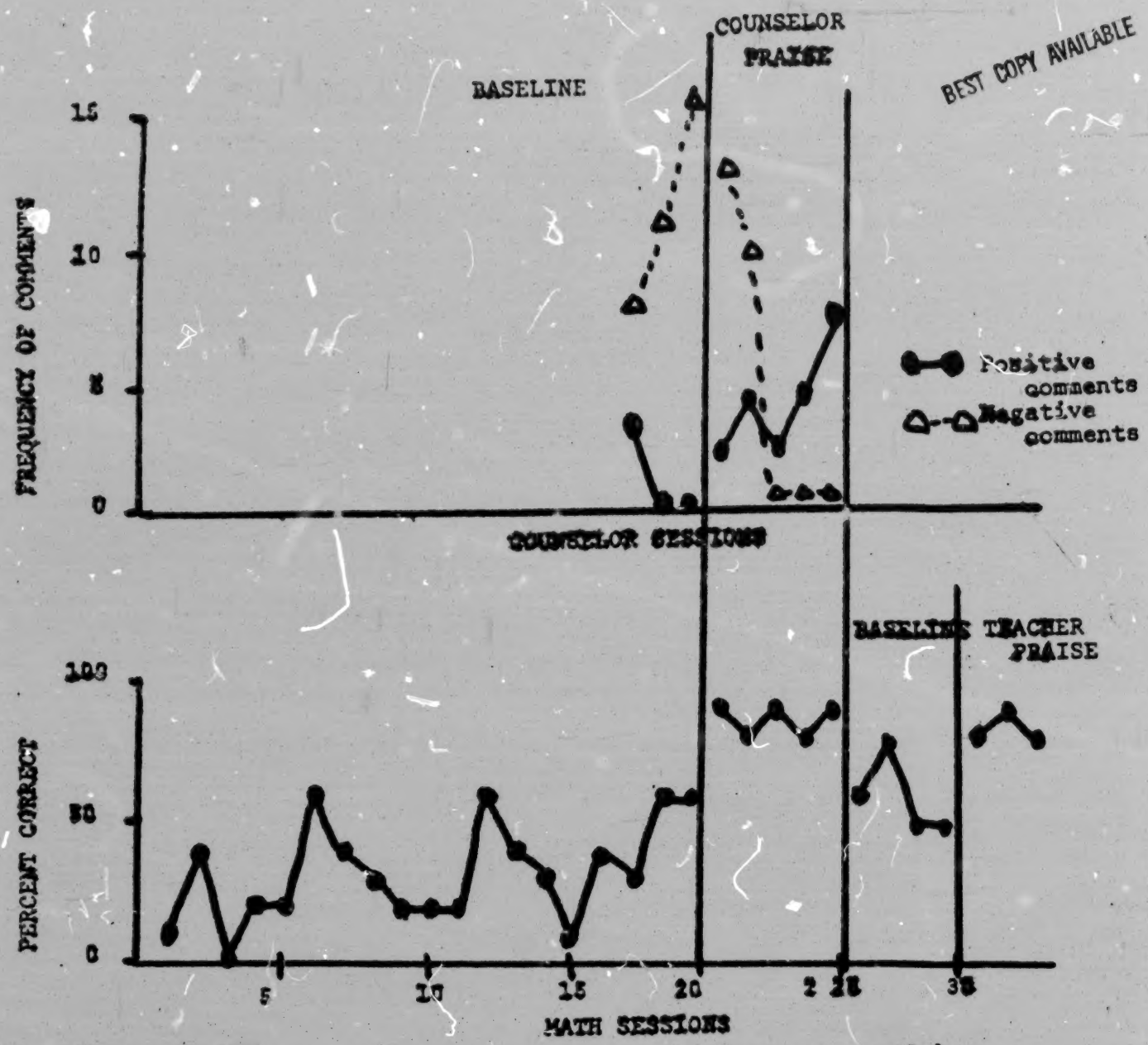

Fig. 1. The student's performance during each condition

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appear to have the desired effects as Dave's negative responses did decrease and his positive responses increased. He did not go to the office as often to make negative comments.

Concurrent measures in math indicated contingent praise for positive responses was effective in increasing math performance, too. When contingent praise was implemented for Dave's positive responses, his performance increased. When the counselor was no longer available to give praise for positive responses, his math performance decreased, but not as low as his previous level of performance. Upon observation of Dave's progress with contingent praise, the teacher provided contingent praise for Dave as follow through. Dave's performance returned to a previous high rate and he progressed to a higher math skills level.

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The Effects of Modelling and Contingent Praise From A Peer Tutor On Accuracy On Fractions Worksheets for a Seventh Grade Boy

by

Robert Bradley, Ann Egner, and Phyllis Paolucci

A frequently voiced comment from classroom teachers is that "Jill understands the work, but just won't do it if I'm not standing over her." Typically, accuracy of the child's work is poor, test performance erratic, and grades are low.

Peer influence has been demonstrated to be an effective technique for improving classroom behavior, eg, social behavior (Wolf, Hanley, King, Lachowicz, and Giles 1970:)

(Surret, Ulrich, and Hawkins 1969) utilized an elementary student as a "student engineer" to modify the academic behavior of a group of four fourth grade students. Other investigators and Academic behavior are (Evans and Oswalt, 1968; and Burdett 1969; Conlon, Hall, and Hanley 1970;) explored the effects of peer correction procedures on the arithmetic accuracy of two children with academic deficts and included an assessment of the peer corrector's daily performance.

The present study was designed to examine a traditional present-demonstrate-re-present model of peer tutoring. As well as the effects of an immediate praise/immediate correction model when praise and correction were administered in a fixed ratio schedule which is adjusted in response to the student's performance.

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Method

Student and Setting

Percival was referred because of a significant deficit performance in arithmetic. He appeared almost totally ignorant of facts concerning fractions, as demonstrated by minimum objective tests administered by his classroom teacher. Percival was a 13 year old seventh grade boy described in school files as a boy who "just doesn't seem to have the ability. Needs much repitition. Has no creative thinking and cannot answer question. No reasoning power. Parents realize Percival's mental abilities." In September 1972, he scored 83 on a Gates I.Q. test. He had not attended kindergarten, nor had he repeated any grade.

Percival was assigned to a heterogeneous arithmetic class of 21 students which met daily for 50 minutes. In addition, tutoring by a peer tutor under the supervision of the writer was used three times a week during a study period.

Meetings were held for four sessions in an 8'x8' office. On the fifth session a move was made to a large common room approximately 20'x20', one side of which faced a major hallway of the school.

Entry Level Measures and Results

Two entry level tests were devised. (See inclosure 1.) Questions on these tests were examples of the problems specified by the classroom teacher as the minimum instructional objectives.

Questions 1-5	Objectives 3,4,5,6 (identifying fractions)
Questions 6 (5 problems)	Objective 7 (reducing)

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Question 7 (5 problems	Objective 8 (mixed & improper)
Question 8 (5 problems)	Objective 9 (lowest common denominator)
Question 9 (5 problems)	Objective 10

All of the first five questions on both tests for objectives 3,4,5, and 6 had to be correct for material to be considered as "mastered". Similarly, four of five problems of each subsequent question on both tests had to be correct for an objective to be considered as "mastered".

Percival's entry level on fractions was as follows:

Question Nr.	Number Correct	
	Test 1	Test 2
1-5	2	2
6	0	0
7	0	0
8	0	0
9	0	0

Instructional Objectives

Given 10 common fractions, some of which are mixed numbers, the student will circle the mixed numbers with 90-100% accuracy within three minutes.

Given 10 common fractions, some of which are proper fractions, the student will circle the proper fractions with 90-100% accuracy within three minutes.

Given 10 common fractions, some of which are improper fractions, the student will circle the improper fractions with 90-100% accuracy within three minutes.

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Given 10 whole numbers and instructions to convert the whole numbers to fractions with a specified denominator, the student will write the fractions with 90-100% accuracy within five minutes.

Given 10 common fractions reducible to a whole number, the student will reduce the fraction to whole numbers with 90-100% accuracy within five minutes.

Given 10 common fractions not in lowest terms and instructions to reduce the fractions to lowest terms, the student will write the answers with 90-100% accuracy within 10 minutes.

Given 10 common fractions of the form $N\frac{a}{b}$ and instructions to change the mixed numbers to improper fractions, the student will write the answer with 90-100% accuracy within 10 minutes.

Given 10 sets of 3 common fractions that are proper, improper, or mixed numbers and instructions to find the lowest common denominator, the student will write the lowest common denominators with 90-100% accuracy within 10 minutes.

Note: The term common fraction used here refers to positive whole numbers, excluding zero, to the base ten, written in the form $\frac{a}{b}$ or $N\frac{a}{b}$. N,a, and b are the positive whole numbers excluding zero to the base ten.

Daily Measurement Procedures

Each session, Percival was presented with work sheets containing thirty problems to solve. These problems were grouped in lots of ten, each lot of ten keyed to one instructional objective. These problems were corrected by the tutor as completed if the contingency in effect required it, or were corrected on Percival's departure. The percentage of correct responses was recorded.

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The writer then checked every response made to insure that the tutor's marking was correct. Any discrepancy found was indicated to the tutor who reworked the problem. Reliability was to remain at 100%.

Teaching/Learning Procedures

Baseline data were gathered in the presence of the tutor. The tutor read all directions to Percival, but other than re-reading, the tutor answered no questions. The writer was also present as a neutral observer out of the range of Percival's vision.

Two teaching/learning procedures were employed:

a. Modelling.

b. Contingent praise by tutor.

a. Modelling

The modelling procedure required that the tutor demonstrate how a type of problem was solved. The demonstration problem was presented on half a sheet of paper previously prepared by the writer. The problem was similar to but not one of the problems appearing on the daily work sheet. The directions associated with the problem were stated by the tutor, such as "Reduce to lowest terms." (Sample scenario attached at inclosure 2.) Then the tutor solved the problem, explaining what he was doing as he worked. Percival was then asked if he could work a similar problem. If the answer was "No", another problem was demonstrated with an explanation. If the answer was "Yes", Percival was given a similar problem. If it was solved correctly, the tutor said "Correct", collected and covered all samples, and presented the daily work sheet with 10 problems requiring a

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Tutor Training

The tutor was told that he was going to be the writer's assistant, and that he must follow directions exactly. He was required to model a procedure for the writer before working with Percival. He was required to develop his own answer sheet, checked by the writer to insure 100% accuracy, before working with Percival. Training required approximately one half hour, with about five minutes required for liaison before each session.

Results

Figure I shows Percy's performances on mastering each objective. On objective 7a, during baseline 1 of six days, Percival scored a mean of 1.6% correct responses with a median of 0% and a range of 0-10%. When modelling was initiated by the peer tutor, the first paper was entirely correct, 100%. With a return to baseline conditions for 20 sessions, baseline 2, Percy's scores varied with a mean of 70%, a median of 75%, and a range of 0-100%. With modelling again instituted on the 28th session, the first subsequent paper was entirely correct. A return to baseline conditions for seven sessions reflected a mean of 70%, a median of 70%, and a range of 40-100%. (Once contingent praise had been determined to be effective it was instituted for the objective on session 36 for ten sessions. Percy's performance reached mastery level with a 96%, median 100%, and the range from 90-100%.)

On objectives 3,4,5, during baseline 1 of five sessions, Percival had a mean of 34% correct responses, a median of 30%, and a range of 10-50%. When contingent praise by the peer tutor was instituted, on the sixth session and continued for six

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sessions, the mean increased to 96%, the median to 100% and the range was 80-100%. A return to baseline conditions, B/L-2, for eight sessions caused a decrease in the mean to 74%, median to 75%, and the range was 30-100%. Reinstituting contingent praise on the 20th session showed a mean of 80%, a median of 80%, and a range of 60-100%. A return to baseline, B/L-3, for four sessions on the 36th session showed a mean of 50%, a median of 50%, and a range of 40-60%. A return to cintingent praise on the 40th day for six days raised the mean to 93%, the median to 95%, and showed a range of 80-100%.

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Results

1. Objective 7a

	Range	Median	Mean
Baseline 1	0-10	0	1.6
Model	100	100	100
Baseline 2	0-100	75	70
Model	100	100	100
Baseline 3	40-100	70	70

2. Objectives 3,4,5

	Range	Median	Mean
Baseline 1	10-50	30	34
Contingent Praise	80-100	100	96
Baseline 2	30-100	75	74
Contingent Praise	60-100	80	80
Baseline 3	40-60	50	50
Contingent Praise	80-100	95	93

3. Objective 6

	Range	Median	Mean
Baseline 1	0	0	0
Model	100	100	100
Baseline 2	0-100	45	48
Model	100	100	100
Contingent Praise	80-100	100	94

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4. Objective 7

	Range	Median	Mean
Baseline 1	0-10	10	8
Model	80-100	90	90
Baseline 2	20-100	85	74
Model	100	100	100
Contingent	60-100	90	83

5. Objective 8

	RAnge	Median	Mean
Baseline	0	0	0
Model	0-100	80	65
Contingent Praise	40-100	90	87

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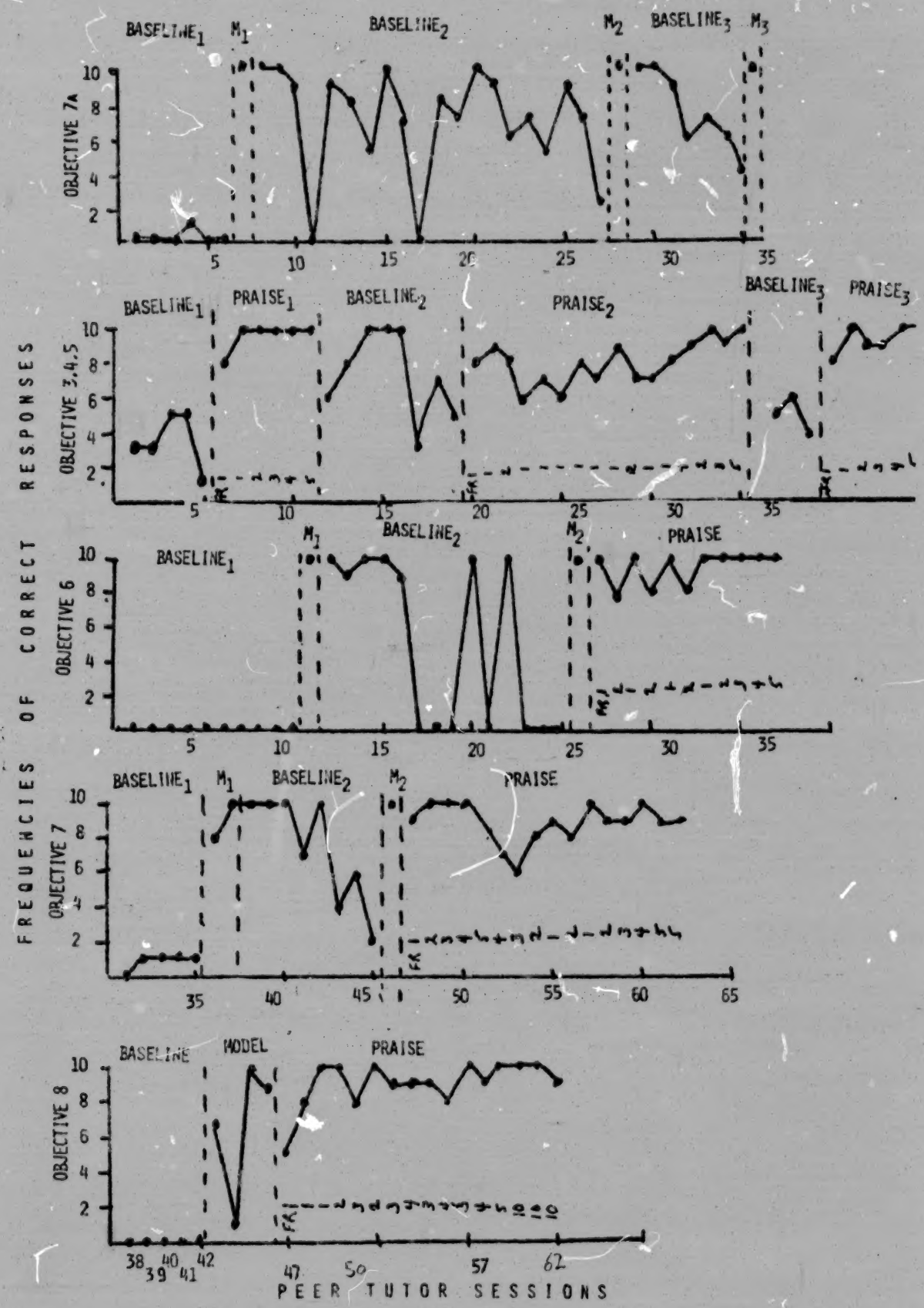

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Percy's performance on Objective 6 during a ten day baseline was 0%. When modelling was initiated Percival scored 100% on his first subsequent paper. During a return to baseline, Percy's scores fluctuated over a range of 0-100%, with a mean of 48%, and a median of 45%. The modelling was re-instituted, and the first subsequent score was 100% correct. Contingent praise, using a schedule of praise modified by the number of correct responses was begun. Percy showed mastery with a mean of 94%, median 100%, and the range 80-100%.

Percy's mastery of Objective 7 and 5, and Objective 8 followed similar patterns.

Discussion

When modelling was arranged, there was an increase in the number of correct responses made by Percival. In every case, this marked increase was followed by widely varying scores which gradually trended toward lower and lower numbers of correct responses.

When contingent praise was introduced, scores were increased. The schedule of praise could be thinned and the number of correct responses maintained at or above criterion. The desired response was in the students repertoire. It was noted that it became increasingly difficult to raise score levels following a reversal.

A combination of praise and modelling was effective in increasing and maintaining the number of correct responses. It would probably be most effective to use the combination of modelling and contingent praise in those cases where the desired response is not already in the repertoire of the student.

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ENTRY LEVEL TEST 1

25 MINUTE MAXIMUM

1. CIRCLE THE DENOMINATOR. $\frac{3}{5}$

2. CIRCLE THE PROPER FRACTION.

$\frac{9}{2}$ $2\frac{1}{2}$ $\frac{2}{3}$

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3. CIRCLE THE MIXED NUMBER.

$2\frac{1}{3}$ $\frac{1}{2}$ $\frac{3}{2}$

4. WRITE THIS NUMBER AS A FRACTION. 3

5. CHANGE THE FOLLOWING FRACTION TO A WHOLE NUMBER.

$\frac{4}{2} =$

6. REDUCE TO LOWEST TERMS.

$\frac{2}{14} =$ $\frac{4}{6} =$ $\frac{2}{10} =$ $\frac{2}{4} =$ $\frac{4}{8} =$

7. CHANGE THE FOLLOWING IMPROPER FRACTIONS TO MIXED NUMBERS.

$\frac{3}{2} =$ $\frac{15}{7} =$ $\frac{6}{4} =$ $\frac{29}{9} =$ $\frac{11}{6} =$

8. CHANGE THE FOLLOWING MIXED FRACTIONS TO IMPROPER FRACTIONS.

$2\frac{1}{2} =$ $6\frac{5}{6} =$ $4\frac{3}{4} =$ $1\frac{5}{8} =$ $1\frac{1}{6} =$

5. FIND THE LOWEST COMMON DENOMINATOR IN EACH GROUP OF FRACTIONS.

$\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{5}$

$\frac{1}{3}$, $\frac{1}{5}$, $\frac{1}{6}$

$\frac{2}{3}$, $\frac{3}{4}$, $\frac{1}{6}$

$\frac{1}{4}$, $\frac{1}{6}$, $\frac{2}{5}$

$\frac{1}{12}$, $\frac{5}{6}$, $\frac{1}{3}$

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Entry Level Test 2

25 Minute Maximum

1. Circle the numerator. $\frac{3}{5}$

2. Circle the improper fraction.

$4\frac{1}{2}$ $\frac{5}{2}$ $\frac{1}{3}$

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3. Change the following fraction to a whole number.

$\frac{9}{3} =$

4. Write this number as a fraction. 7

5. Invert this fraction. $\frac{3}{2}$

6. Reduce to lowest terms.

$\frac{3}{12} =$ $\frac{5}{5} =$ $\frac{3}{9} =$ $\frac{2}{2} =$ $\frac{5}{15} =$

7. Change the following improper fractions to mixed numbers.

$\frac{5}{3} =$ $\frac{25}{12} =$ $\frac{7}{5} =$ $\frac{14}{11} =$ $\frac{17}{15} =$

8. Change the following mixed fractions to improper fractions.

$3\frac{2}{3} =$ $2\frac{3}{7} =$ $1\frac{1}{5} =$ $2\frac{1}{9} =$ $3\frac{7}{10} =$

FIND THE LOWEST COMMON DENOMINATOR IN EACH GROUP OF FRACTIONS.

$\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$

$\frac{1}{2}$, $\frac{1}{4}$, $\frac{2}{6}$

$\frac{1}{2}$, $\frac{1}{3}$, $\frac{2}{5}$

$\frac{1}{10}$, $\frac{2}{5}$, $\frac{1}{2}$

$\frac{5}{8}$, $\frac{1}{4}$, $\frac{1}{2}$

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Sample Instructions for Tutor

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2 mark Circle the proper fractions.

Say. "Circle the proper fractions, but put a short line under anything else. When you finish a problem so it has either a circle or a short line under it, check it to me and I will correct it."

Answer no questions.

When first problem is circled or short lined, put a large "C" on it if correct, ignore it if wrong. On your work the "C" say "Good!", "You've got it!", "Excellent!" or similar comment. Say nothing if wrong!

Do this for each problem in the set.

Change the following fractions to whole numbers.

Read the instructions aloud.

Do not answer questions

Do not correct work: say and do nothing

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The Effects of a Personal Token System Program on Increasing Reading Comprehension for a Seventh Grade Boy : A Case Study

by

James P. Burns, Phyllis Paolucci, and Ann Egner

The management of classroom behavior of academically retarded pupils by the use of tokens as an operant technique has been demonstrated in a variety of studies. The back-up reinforcers of the tokens have ranged from food and prizes (Birnbrauer, Wolf, Kidder, and Tague, 1965) to access to free play time (Hopkins, Schutte, and Gorton, 1971; and Salzberg, Wheeler, Devar, and Hopkins, 1971).

The effectiveness of token reinforcement procedures in a remedial classroom were examined by Wolf, Giles, and Hall (1968). Tokens were given contingent on the completion of classroom assignments. The tokens were later redeemable for back-up reinforcers that were of interest to the children. Token reinforcement techniques were used by Cohen (1968) to develop academic skills of institutionalized delinquents. Points were turned in for a variety of privileges, money, or consumable items.

The purpose of the present study was to assess whether or not token reinforcement for student-selected reinforcers could effectivel increase the accuracy of a junior high school student's written responses to comprehension questions on various silent reading selections in a regular public school setting.

Method

Student and Setting

Roger was a 14 year old boy in the seventh grade at Albert D.

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Lawton School in Essex Junction, Vermont. Roger had a past history of extremely poor reading skills as evidenced by his school records. He had previously repeated two grades because of his poor academic skills. On the Lorge-Thorndike Intellignece Test (taken in 1972) Roger scored 85 and on the Otis-Lennon Mental Ability Test, Form K (taken in 1972) he scored 74.

Reading sessions were held in a storage room next to Roger's reading classroom. Only the tutor and student were present during the tutoring sessions except for sessions 14, 27, 34, and 42 when an independent observer was present to obtain reliability.

Liddle's Reading for Concepts* series (1970) was used. The series consisted of eight books that ranged from a reading level of 1.6 (Book A) to a maximum level of 6.7 (Book H). A story had an average of 155 words in it. At the end of each story were eight comprehension questions. The questions were either fill-in or multiple choice. A sample question would be, "The main idea of the whole story is: a.) that most people sleep all day, b.) that the Earl never got hungry, c.) why the first sandwich was made."

The written responses to the comprehension questions were kept in a stenographer's note pad.

Daily Measurement and Reliability Procedures

Comprehension responses consisted of the student's written answers to five selected questions at the end of each story. The tutor corrected Roger's written work immediately. A percentage of correct

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*Liddle, William. Reading for Concepts. New York: McGraw-Hill Co., 1970.

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responses was computed by dividing the number of correct responses by five and multiplying by 100%. This percentage was then plotted on a graph to provide a convenient pictorial record of Roger's daily performance.

Reliability of procedures was obtained by having another person observe the tutor at random sessions. Reliability of scoring Roger's written responses was obtained by having a second person rescore the student's written work.

At every fifth session, the tutor obtained a measure of Roger's comprehension accuracy on material at higher grade equivalencies. When Roger obtained 80-100% correct on assignments in this material, he was given daily assignments at that level.

An ABAB experimental design was used to determine the effectiveness of the token reinforcement system.

Procedures

Prior to baseline conditions the daily procedures were explained to Roger.

Baseline$_1$: First the student read aloud and defined each word in the section of the reader entitled "Words You Will Need" (which contained words that were determined by the author to be new or difficult for the student). Next, the student silently read the story for that section and completed five comprehension questions concerning the story. At any time during the silent reading or written work, Roger was allowed to ask what any word meant.

When the five comprehension questions were completed, the tutor corrected them. If five out of five (100%) or four out of five (80%)

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were completed correctly, then the session was terminated for that day or another story could be covered. This was decided by the student. Due to time factor of the tutoring session, a maximum of only five stories could be covered. If the student opted to terminate the session, he returned to his classroom.

If the 80% minimum criteria was not achieved, then the student re-read the story and re-answered the written questions until the minimum of 80% was achieved.

Tokens$_1$: The same procedures as described in the baseline condition were used in this phase with the following additions.

The student was told that now his correct responses on his first attempt at the comprehension questions would be worth points. The points were distributed in this manner:

# of Correct Answers	Point Value
1	2 points
2	7 points
3	15 points
4	30 points
5	50 points

(Points were not earned for repeated readings when the student scored less than 80% on the first approximation.)

The student was shown a reinforcement menu which consisted of various items for which Roger, during a pre-baseline meeting with Roger and his parents, had expressed some interest and enthusiasm. All items had a corresponding point value. The student was told to pick one or more of the items that he would like to earn. A ceiling of

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2,000 points was placed on the amount of points that he could earn. Roger chose a canteen (700 pts.), a camping mess kit (900 pts.), and a backpack (1100 pts.).

Baseline$_2$: This was a replication of the Baseline$_1$ conditions.

Tokens$_2$: This phase was a return to the conditions described in Tokens$_1$.

Results

Reliability of procedures and scoring responses was 100% on all occasions. In addition, on story 42 Roger's performance in Book C (3.7 grade equivalent) reached 80%-100% on two successive probes thus making him eligible for daily lessons on this material. By story 52, Roger had reached an 80%-100% level of success on Book E, a 4.3 grade equivalent.

Figure 1 shows Roger's percent of correct responses to the reading comprehension questions for each story. During the Baseline 1 condition, the percent of correct responses ranged from 0% to 60% with a mean of 33%, while during Tokens 1 Roger's correct responses ranged from 20% to 100% with a mean of 82%.

With a return to baseline, the percent of correct responses decreased to a range of 20% to 60% with a mean of 48%.

When tokens were reinstated, Roger's correct responses ranged from 80% to 100% with a mean score of 91%

Discussion

At the start of the tutoring sessions, two alternatives were available. One alternative was to supplement Roger's deficit reading

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skills by providing remedial instruction beginning with the preprimer level and teaching the component skills of phonics, word recognition, oral reading, and answering comprehension questions. This remedial procedure might have involved considerable time on the part of the tutor and student on material far below his actual grade level. Thus, Roger might have fallen farther and farther behind the required grade level performance.

The other alternative was to contingently reinforce a higher level of reading accuracy without the time consuming intermediate steps of teaching the component skills. The latter alternative was chosen since the student had a long history of instruction in regular and remedial reading classes and since his baseline performance was greater than zero.

The results clearly indicate that Roger's responses to the reading comprehension questions were under the control of the token reinforcement system. The findings of this study closely parallel those of Wolf, et al. (1968) with academic behaviors. In both studies, a student's mastery of standard instructional materials was demonstrated to be a function of contingent token reinforcement. While many remedial programs at the junior high school level continue to teach deficit learners at a lower level of academic skill (i.e., using a pre-primer level of reading for a seventh grader), the present findings and those of Wolf, et al. suggest that through the use of contingent reinforcement of a higher level of academic behavior, the deficit student may achieve success on levels higher than expected of him, as demonstrated by Roger's rapid advancement through reading material of higher grade equivalents.

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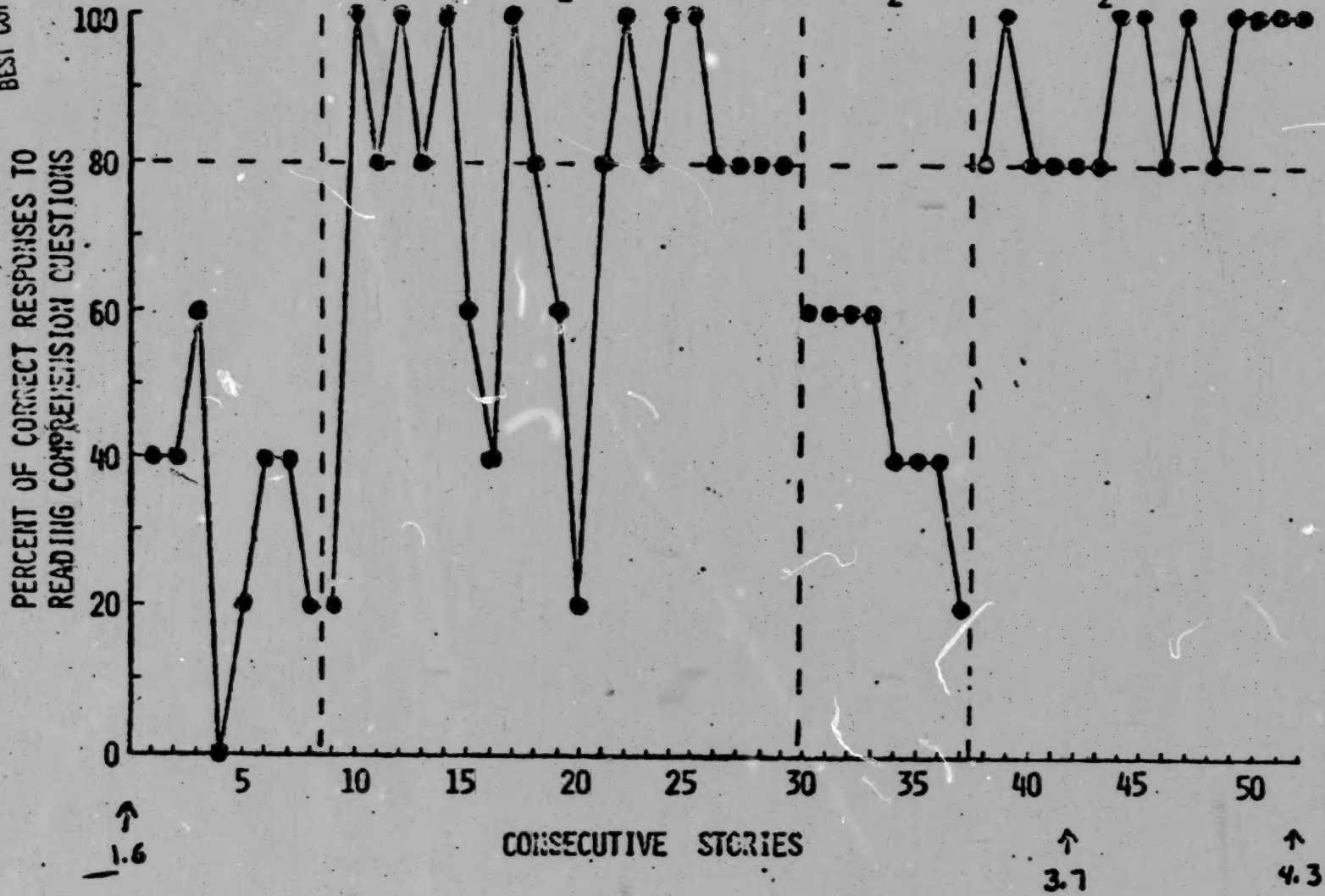

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The findings of the present study also suggest that there are advantages of viewing academic behaviors as a function of contingencies of reinforcement. The use of contingent reinforcement for academic behaviors should not be overlooked or held as a last resort in aiding a deficit learner at the junior high school level but should be used as a means of aiding the learner to achieve higher levels of academic success.

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The Effects of Contingent Free Time on Increasing Study Behavior for Two Ninth Grade English Classes

by

Martha Malcolm and Joseph Abruscato

Hamblin, Hathaway, and Wodarski (1971) demonstrated the values of group contingencies and teamwork on improving academic achievement. Stillwell and Harris (1971) showed that available classroom reinforcers, (e.g., teacher attention) can improve study behavior as well as completion of assignments when a class can work together to achieve a desired contingency (such as free time), study behavior and work behavior can improve for all.

Method

Subject and Setting

Either vocational or college preparatory courses were offered at this community high school. The majority of the students in these two English classes were only eligible for vocational courses. The classes met daily for 54 minutes.

Individually assigned work was assigned by the teacher according to each students deficiencies. Everyone was working on something different in one of four areas: grammer, vocabulary, spelling, or reading. Twelve basic objectives had to be completed for the course. Students also worked on worksheets for the objectives for those areas. It was very difficult to maintain a quiet atmosphere conductive to good study. Some students would invariably fail to do their work, walk around the room and chat, or engage in disruptive behavior. Therefore, the problem was how to maintain the desired

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study behavior. In addition, each class had one or two "trouble-makers" who seldom completed individually assigned work and spent more time looking around the room or talking.

Class 1 consisted of 10 low-level 9th graders of one girl and nine boys. S_1 was one of two students who were notable troublemakers and talkers.

Class 2 consisted of 19 students, 4 girls. S_2 was the target student.

The following instructional objectives was derived to enable the students to develop more appropriate classroom study behavior.

Given a list of study rules	the students will follow the class rules	100% of the time

The rules were:

1. Sit in assigned seat (except for sharpening pencil or using materials away from seat)
2. Talk only with teacher permission
3. Use appropriate language and tone of voice
4. Use all materials and equipment properly

Measurement and Reliability Procedures

The class time of 54 minutes was divided into 10 segments of unequal values totaling 44 minutes. These numbers were written on file cards. The cards were rotated so that the teacher started with a different card every day. The teacher set a kitchen timer for the number of minutes indicated on the first card for that day. When the timer rang the card was moved to the back of the pack and the timer was set, based on the next number card and so on, until the timer had

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been set a total of ten times. Each time the bell rang, the teacher and/or observer looked around the room. If all students were following the study rules they recorded a plus (+) on their data sheet, if any one was not following the rules they scored a minus (-). A percentage of study behavior was determined by dividing the total number of pluses by 10 and multiplying by 100.

Individual study behavior was recorded for S_1 during class 1 and S_2 during class 2. The definition for individual study behavior was "Student is in the assigned seat with face oriented behavior toward material and/or appropriate speaker."

A plus (+) was recorded at the end of each time sample if the student was in his seat and face oriented to material or speaker; a zero (0) was recorded if he was engaging in any other behavior. A percentage of study behavior was calculated by summing the number of +'s, dividing by total number of samples, multiplied by 100. In addition, S_1 was also measured or assigned a daily reading assignment or objective assignment each day making each day's work follow the same pattern. A percentage correct was calculated by dividing the total number correct by the total number assigned multiplied by 100.

Reliability was determined at least once during each condition of the study by comparing each of the teacher's data points with the observers, dividing the total number of agreements by 10 and multiplying by 100.

Baseline

During Baseline$_1$ and $_2$, the plus and zero marks were not shown to the students and no consequences were given for following study rules.

Contingent Free Time

After Baseline, before the introduction of contingency 1, the teacher discussed that the reason for the timer was to observe how well

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the class was following the established study rules. She explained that each day the rules would be posted on a large chart in the room. Each time that the bell went off, a plus or zero would be recorded on the blackboard for the class as a whole. For each plus, one minute of free time was recorded. For each zero, the one minute of free time was not earned. Therefore, 8 pluses and 2 zeros meant that the students would have to work for two extra minutes before they could have their 8 minutes of free time.

In addition, the teacher continued to record the scores for the class and individual students on her data sheet.

Results

Figure 1 shows that for both classes, the class study behavior was dramatically improved during contingent free time when compared to baseline performance. For class 1 during $Baseline_1$, the mean percentage of appropriate work behavior was a 10%. During $Contingency_1$, the mean was 79% - a 69% increase over $Baseline_2$. During reversal, the mean again dropped to 10%. And in $contingency_2$, study behaviors increased to 70%.

In addition to the improved study behavior and atmosphere of the classroom, the teacher noticed that academic work improved. S_1's study behavior followed the same pattern averaging 60% and 70% during baseline conditions and increasing 90% and 88% during contingency conditions. Figure 2 shows the concurrent improvement in accuracy on S_1's assignments. For class 1 on four occasions during each class reliability of measurement was obtained. Percentages of agreement ranged from 90-100% with an average of 95%. For S_1 percentage's of agreement ranged from 90-100 with an average of 97.5%.

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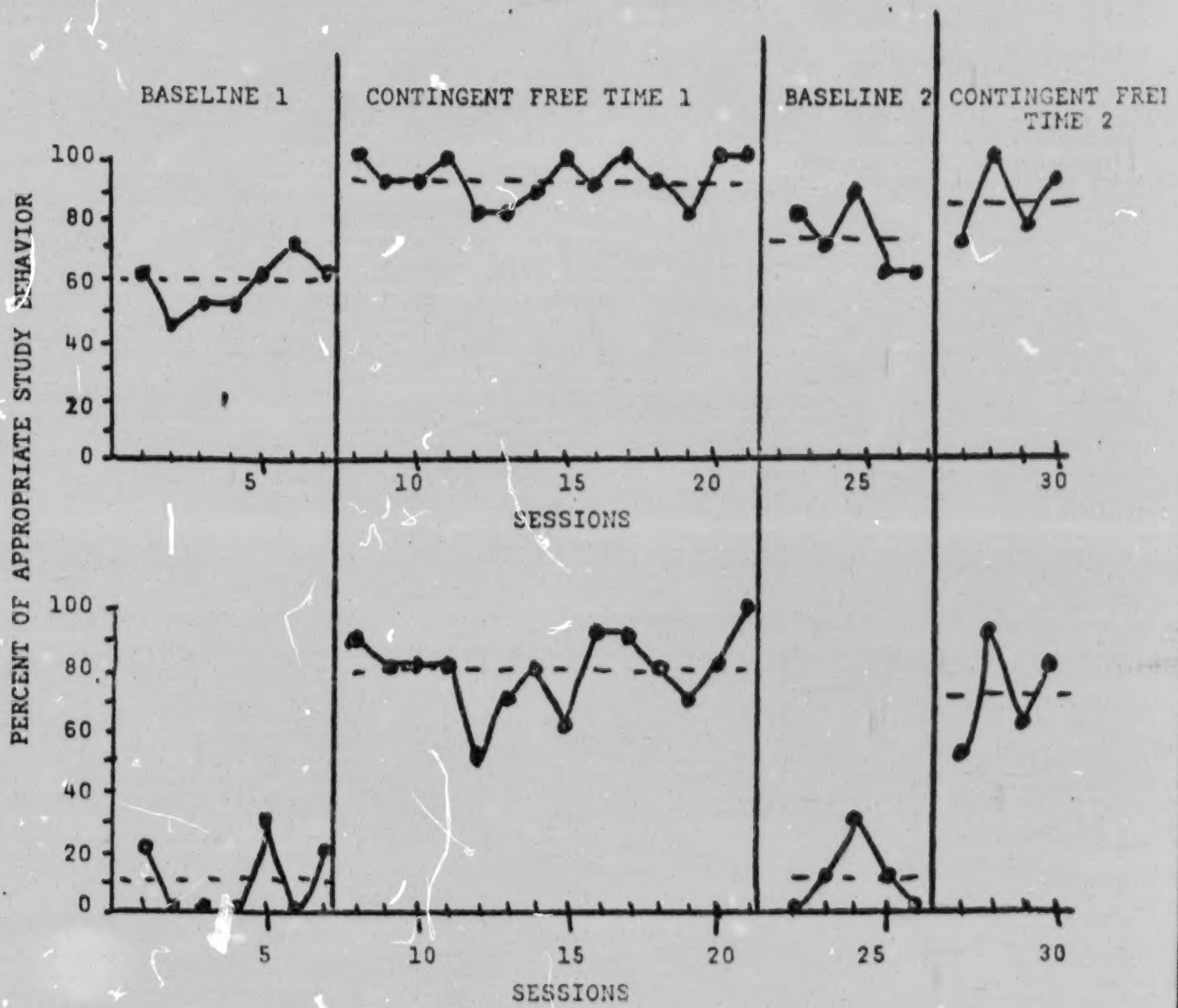

Fig. 1. The teacher's record of study behavior for Student 1 (top graph) and Class 1 (bottom graph) during each condition. The dotted line indicates the average for each condition.

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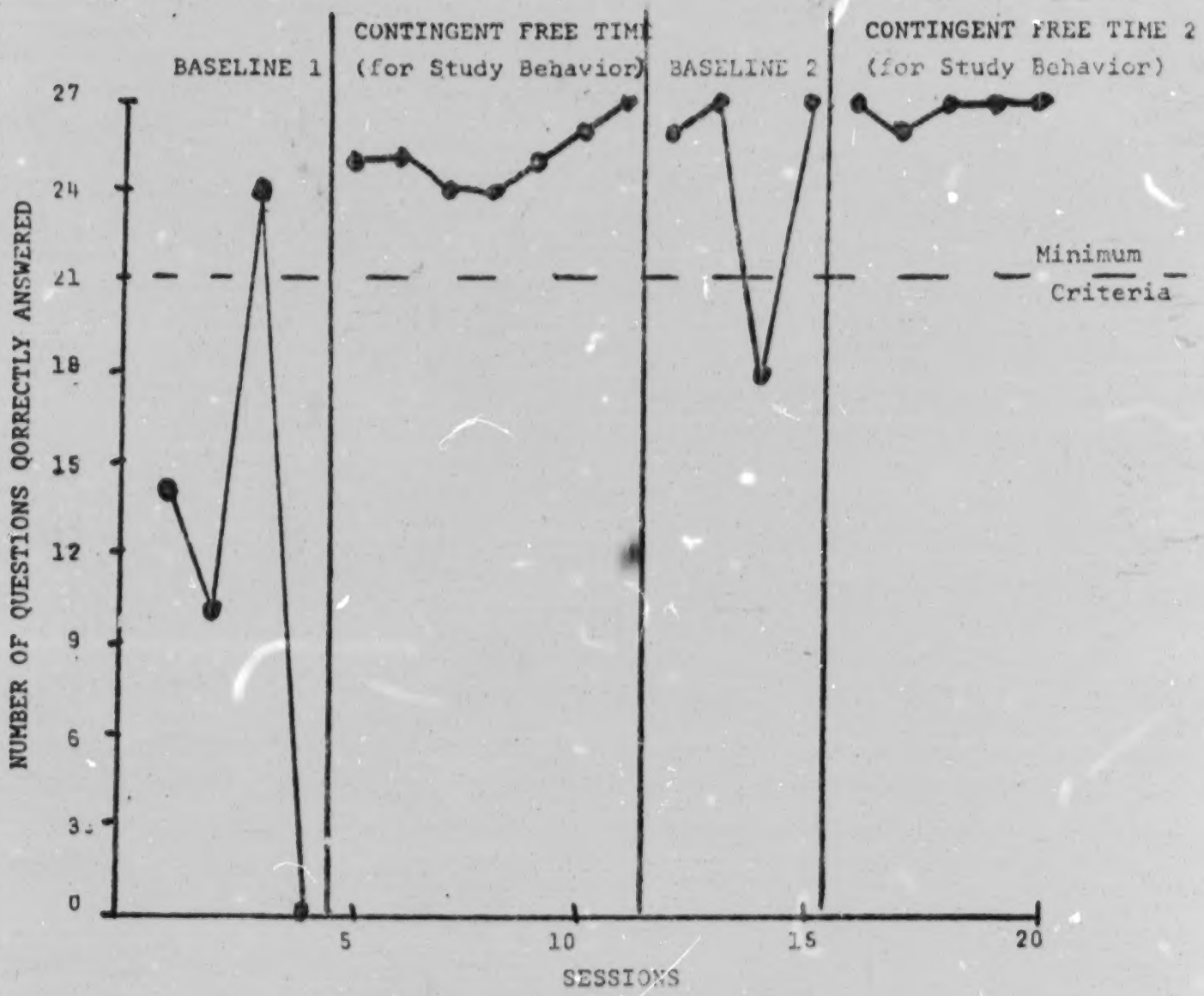

Fig. 2. Concurrent changes in academic behavior for Student 1 during each condition. The instructional objective was: Given 3 stories of equal length and 3 equal sets of questions during a 20 minute session, the student will read and answer questions with 80-100% accuracy.

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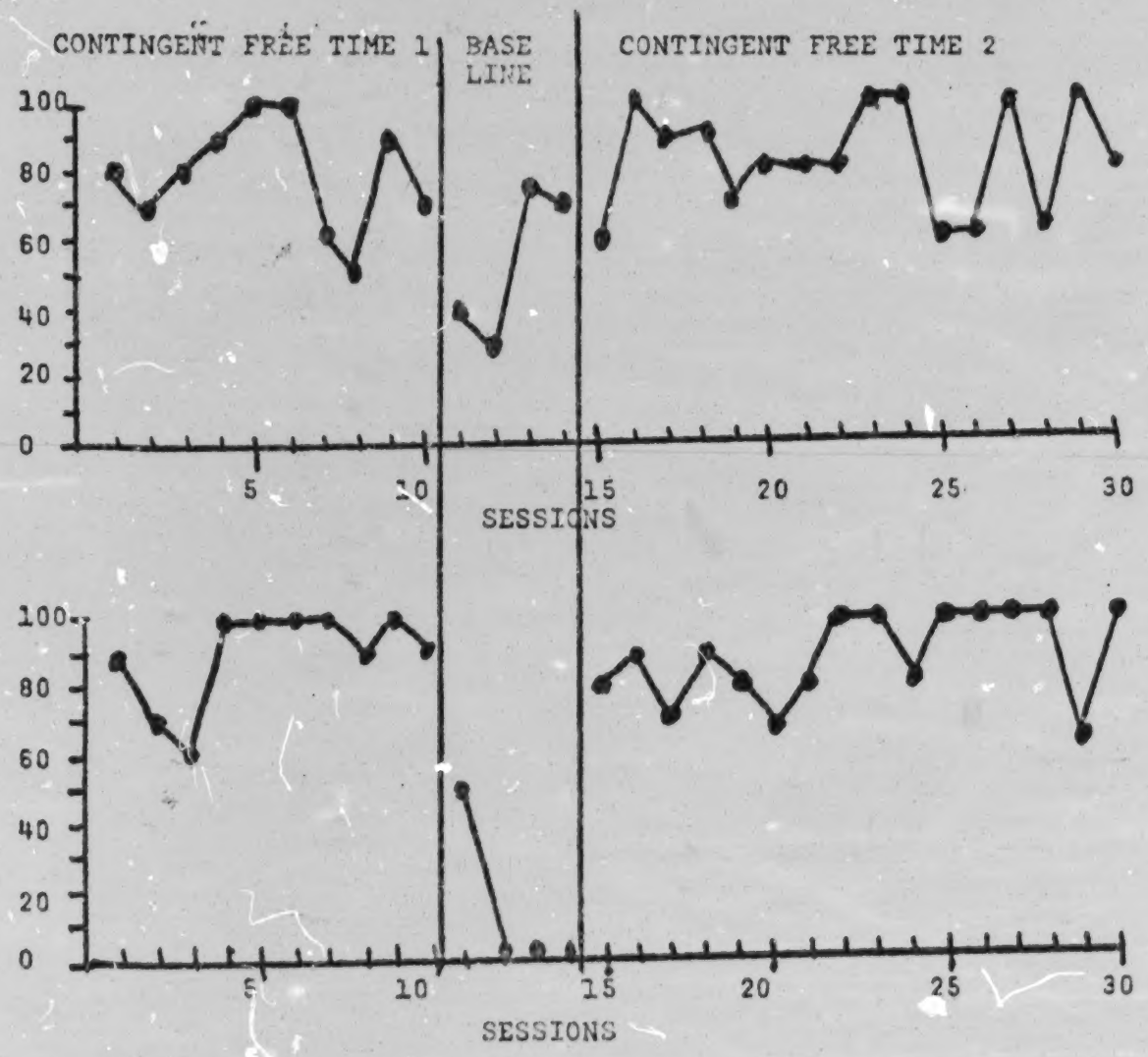

FIG. 3. The teacher's record of study behavior for Class 2 (bottom graph) and Student 2 (top graph) during each condition.

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Figure 3 shows the results for S_2 and Class 2. During contingency 1 and 2, S_2's study behavior averaged 79% and 82%, respectively, compared with an average of 54% during baseline. The same pattern was demonstrated by the class, averaging 90% and 84% during contingency 1 and 2, compared with 13% during baseline.

Discussion

Both the teacher and students were pleased with the ability to earn the free time. During this free time, checkers or chess could be played or the students could chat among themselves. It also gave the teacher a chance to be "human" and also learn to be gracefully beaten by her students in chess! The students liked the opportunity to manage this portion of their class; a choice that was totally up to each of them. Sometimes they even reprimanded each other for the sake of the group. Even the most talkative students learned to monitor their behavior, and generally it gave the room an atmosphere far more conductive to individualized study; and enabled the teacher to circulate and help students instead of reprimanding them.

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The Effects of Flashcards Versus Computer Assisted Instruction on Acquisition of Division Facts for a Sixteen Year Old Ninth Grader

by

James Myers and Joseph Abruscato

Student and Setting

Jack was a sixteen year old male student in a ninth grade general mathematics class. The class consisted of 20 students who ranged from zero to five years below grade level in math performance. Standardized tests given when Jack was in the seventh month of the eighth grade indicated an I.Q. of 84 (WISC). The Iowa Test of Basic Skills administered at the same time showed that Jack had a grade equivalent of 2.0 in reading, 2.0 in spelling, and 3.6 in arithmetic. Statements from Jack's teachers and psychologist written in his permanent folder included references to "hyperkinetic disorders," "epilepsy," "disruptive school behavior," and "learning disabilities with a brain disorder."

Through the student's daily work in general mathematics, the teacher observed a deficiency in Jack's responses to division facts. This study attempted to determine the relative effectiveness of two methods of teaching division facts--computer assigned instruction and self-instruction using flashcards.

The classroom was approximately thirty feet long and twenty eight feet wide and had no windows. Desks were arranged at random interspersed with four six-foot work tables placed one to a quadrant. The computer as well as other hardware (3 electronic

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calculators) was on the periphery of the room. The class met for fifty-two minutes a day, five days per week.

Materials used for the study were a set of fifty-two flashcards representing division facts missed by Jack on two separate occasions. The student's self-instruction with groups of these flashcards was compared to instruction with a NCR-260 computer terminal connected by telephone lines to a Xerox Data Systems Sigma 617 computer located at the University of Vermont. A program for instruction in division facts was prepared by the teacher for use during the computer assisted instruction portion of the study.

Procedures

To determine the specific division facts which Jack did not know, the teacher prepared a deck of ninety flashcards each representing one fact. On two separate occasions Jack was tested on the ninety facts. The teacher sat facing Jack. Jack was given a sheet of paper and directed to number from one to ninety. The teacher held the flashcard deck and exposed each card in turn. Jack objected to both testing sessions and had to be coaxed to cooperate. Those facts missed on both tests were selected as the target facts for the study. Fifty-two facts were thus selected.

These fifty-two division facts were divided by the teacher into four groups of thirteen. This separation of the facts into groups was done so that each group of facts would be of comparable difficulty. Table III shows the distribution of facts into Groups I, II, III, and IV.

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Division facts in Groups I and III were taught by means of self-instruction procedure with flashcards. Division facts in Groups II and IV were taught by computer assisted instruction.

Measurement Procedure

A daily measure was obtained on Jack's correct responses on a thirteen item answer form filled out by Jack as the teacher presented each of the thirteen cards. He was given five seconds to write each answer. After the presentation of the thirteenth card and the recording of the student's response, the teacher and student simultaneously corrected the answers. A percent correct was computed by dividing the number correct by 13, multiplied by 100. When Jack achieved 100% for two consecutive days, he began to work on the next group of cards under the next condition.

Condition I: Flashcards

The flashcard procedures was used for the division facts in Group I and III. When Jack entered the room, he was given a pack of thirteen flashcards and directed to study the flashcards for twenty minutes. The student took his seat and was allowed to work or not work as he chose. Minimal coaxing was used by the teacher. All requests by the student for early measurement were refused. After twenty minutes, Jack returned the flashcards to the teacher and was given a five minute rest period followed by the measurement procedure.

Condition II: Computer Assisted Instruction

The computer assisted instruction procedure described as

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RANKED FROM MOST DIFFICULT DOWN:

A Flashcards	B Computer	C Flashcards	D Computer
$9\overline{)81}$	$9\overline{)72}$	$8\overline{)72}$	$8\overline{)64}$
$7\overline{)63}$	$9\overline{)63}$	$8\overline{)56}$	$7\overline{)56}$
$6\overline{)54}$	$7\overline{)49}$	$9\overline{)54}$	$8\overline{)48}$
$5\overline{)45}$	$9\overline{)45}$	$6\overline{)48}$	$7\overline{)42}$
$8\overline{)40}$	$6\overline{)42}$	$4\overline{)36}$	$5\overline{)40}$
$5\overline{)35}$	$8\overline{)32}$	$4\overline{)32}$	$7\overline{)35}$
$4\overline{)28}$	$9\overline{)27}$	$7\overline{)28}$	$6\overline{)30}$
$8\overline{)24}$	$3\overline{)24}$	$3\overline{)27}$	$4\overline{)24}$
$3\overline{)21}$	$6\overline{)18}$	$4\overline{)20}$	$7\overline{)21}$
$4\overline{)16}$	$2\overline{)16}$	$2\overline{)18}$	$3\overline{)18}$
$2\overline{)6}$	$2\overline{)14}$	$3\overline{)15}$	$2\overline{)10}$
$6\overline{)0}$	$8\overline{)0}$	$7\overline{)0}$	$9\overline{)0}$
$2\overline{)0}$	$3\overline{)0}$	$4\overline{)0}$	$5\overline{)0}$

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follows was used for the division facts in Groups II and IV. The student was introduced to and worked alone at the computer terminal for a 20 minute teaching/learing procedure. The computer program was arranged such that the 13 division facts were presented in order. The student typed in the answer for each fact. The computer printed a congratulatory comment for correct responses or printed the correct response. The program repeated the same sequence of 13 facts again and again until a computer clock shut the program down after 20 minutes. The computer printed out the number of problems presented, number correct, and the percent correct.

Results

Figure 1 shows Jack's daily performance. Table 1 summarizes the computer program's five phases. Jack met criteria for the division facts for group I using flashcard procedure in six days with an average accuracy of 89% (ranging from 76% to 100%). Jack met criteria for the division facts in Group II using the computer program in nine days with an average accuracy of 84% (ranging from 69% to 100%). Jack did not meet criteria for the division facts in group III (after twelve days). In 15 sessions Jack met criteria for division facts in group V using the computer program. He mastered the facts in group II using the computer program in five days.

Discussion

This study compared the effects of a computer to that of a deck of flashcards with respect to the rate of acquisition of basic divis-

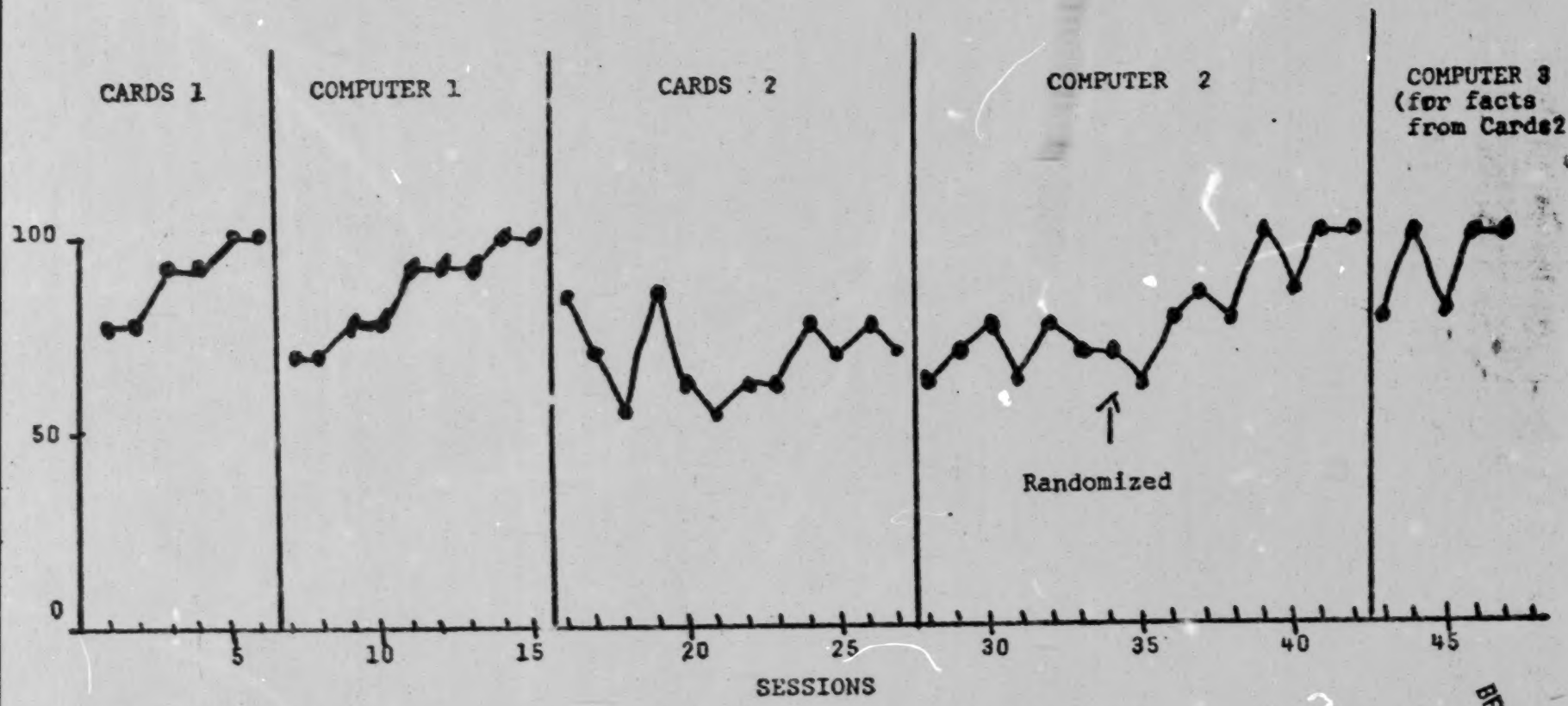

Fig. 1 The teacher's record of Jack's performance on basic division facts during each condition.

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ion facts. A casual look at the data seems to indicate a significant but inconsistent difference as noted by the comparative slopes of the least squares best fit lines from Table 2. The flashcards seem to hold an advantage in phases 1 and 2 while the computer holds a decided edge in phases 3 and 4.

The differences observed between rates during $Cards_1$ and $Computer_1$ might be attributed to eight absentee days during $Computer_1$ as opposed to none for $Cards_1$. Also, there was a fair amount of technical skill and knowledge to be acquired as a prerequisite for working independently at the computer terminal as contrasted with very little to work with the cards. Several times in the beginning the student made an error in typing or misinterpretted a message so as to cause interruption of the program and thereby necessitating a reset or intervention by the instructor for technical purposes.

The differences between $Computer_1$ and $Cards_2$ might be attributed to disappointment on the part of the student because he was removed from the terminal and placed on the cards which he expressed verbally to the instructor. Also, he was absent 16 days during $Cards_2$.

It was decided that $Computer_2$ should be reinstated even though mastery had not been demonstrated for $Cards_2$ because of lack of progress. This can be seen from the slope of the least squares line in Table 2 as the slope is slightly negative indicating no progress at all.

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CONDITION	NO. OF SESSIONS	RANGE	MEAN*	SLOPE OF BEST FIT LINE	DAYS ABSENT
$Cards_1$	6	23	89.7	5.8	0
$Computer_1$	9	31	85.3	4.4	8
$Cards_2$	12	46	68.8	-0.1	16
$Computer_2$	15	38	78.1	2.1	18
$Computer_3$ for $Cards_2$	5	23	90.8	4.6	0

Table 1. Data from all five phases including number of school days absent during the course of any one phase and the slope of the least squares best fit line.

* Rounded to the nearest tenth.

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Computer$_2$ rates improved dramatically* when the order of the 13 facts was randomized. This was done because the student was apparently memorizing the correct answers in order, then typing them in all at once, thus ignoring the problems.

Progress during Computer$_3$ (on the same facts as Cards$_2$) improved for three possible reasons. First, this was the only time during the study that he knew what the upcoming phase would be (he was not told what would happen after Cards$_1$, Computer$_1$, or Cards$_2$). Second, these were facts that he had seen before from Cards$_2$. Third, the "bugs" had been worked out of the computer program, allowing the student to give each problem full attention and contemplation.

It is unfortunate that the computer program was not randomized at the beginning. It is very possible that this would have made quite a difference in the data in comparing the computer and flash-card progress.

The student indicated a definite preference for work with the computer to the extent of making negative comments and actions when transferred back to cards. For him the computer was a fascinating piece of machinery that paid attention only to him and over which he had control. There was also a matter of some pride and self-esteen that he was the only one in the class on such a technical project.

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*The least squares best fit line shows a slope of +1.3 before this point during Computer$_2$ and +4.5 after this point.

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Increasing the Arithmetic Performance of Two Ninth Grade Students Using Teacher Praise and Immediate Knowledge of Results

by

James Myers and Joseph Abruscato

In this study the effects of teacher praise and immediate correction on the performance of two ninth grade students over two arithmetic skills were compared using a multiple baseline design. The skills involved (1) the solution of simple one-lined word problems involving a simple fraction and (2) the multiplication and division of fractions and mixed numbers. It was the intent to show an improvement in performance due to the introduction of teacher praise and immediate correction during the classroom performance of the target behaviors.

A similar study was conducted by Mary Fresn (1971) with three 6th grade students using arithmetic skills and a multiple baseline design. Her results showed a definite increase in per cent of problems correct with the introduction of teacher praise and immediate correction.

Method

Students and Setting

Pam was a 15 year old girl in an individualized ninth grade general math (remedial arithmetic) class. Her I.Q. score was 93 (Otis-Lennon given at 9th grade, 2nd month). She showed grade equivalencies of 8.4 in reading comprehension and 5.9 in arithmetic when tested with the Iowa Test of Basic Skills at the 8th grade, 6th month. Pam was a quiet and sociable but poorly motivated math student.

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Pat was a 16 year old male in the same class. His I.Q. score was 89 (Otis-Lennon given at 9th grade, 2nd month). He showed grade equivalencies of 5.0 and 7.0 in reading comprehension and arithmetic respectively on the Iowa Test of Basic Skills which was given at the 6th month of the 8th grade. Pat was a large young man with a quiet disposition who was also poorly motivated in this individualized set-up.

Neither Pam nor Pat was disruptive. Neither was sufficiently motivated to progress at a reasonable speed through the prescribed learning experiences. As there was a possibility that both Pat and Pam might fail the course, the instructor felt that some program to increase production was indicated.

Two areas of particular need, as reflected by pretesting at the beginning of the school year, were the solving of simple one-line problems involving simple fractions (either in the problem or in the answer) and the multiplication and division of fractions and mixed numbers.

The class was an individualized general math course which was held five times a week, 9:59 a.m. to 10:51 a.m., September to June. In this class each student was expected to work at his own speed through selected portions of the course as determined by unit pretests. He was expected to follow directions printed in teacher-prepared booklets outlining specific work for mastery of each topic on his own. The student could request help at any time from the instructor or a student aide, both of whom were in circulation in the room at all times.

The room was 28' by 30' with no outside windows. There were 20 students seated at their own discretion among seven tables (6-person

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tables) and eight individual student desks. The seating arrangement varied from day to day, as did the position of the tables, chairs, and desks. Pam sat at a table near the front of the room with two to three other girls while Pat sat with two to three other boys near the back of the room.

The room was well lighted with a stable 68-72° temperature range throughout the year. A moderate noise level was allowed.

Instructional Objectives

For both Pat and Pam the same objectives were derived.

OBJECTIVE 1: The student will write the correct answer to 7 out of 8 (87½%) one-line word problems involving simple fractions (proper fractions or mixed numbers) within 15 minutes for at least three consecutive sessions.

OBJECTIVE 2: The student will write the correct answers to 5 out of 6 (83 1/3%) problems dealing with multiplication and division of fractions and mixed numbers within 15 minutes for at least three consecutive sessions.

Daily Measurement and Reliability Procedures

Each day both Pam and Pat were given two prepared sheets, one with eight word problems (OBJECTIVE 1) and another with six fraction-multiplication-and-division problems (OBJECTIVE 2). Papers were given one at a time: the word problem sheet was given first such that the student had to turn in the first sheet before receiving the second sheet. The instructor noted the time started and time finished on each sheet for both students to insure the 15 minute time limit.

For each student, a percent correct out of eight for the first sheet and a per cent correct out of six for the second sheet was calculated.

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Both papers were corrected by the instructor and then by the aide. In each case the corrector did the problem out to obtain a solution. A percentage of agreement was obtained by dividing the number of agreements by eight for Objective 1 and the number of agreements by six for Objective 2, multiplied by 100.

The average per cent agreement on Objective 1 was 100% for both Pam and Pat in five and six observations respectively. On the second objective, the average agreement was 93.3% over five observations on Pam and 97.2% on six observations on Pat.

Teaching/Learning Procedure

Both Pam and Pat were given individual personal instruction on both objectives by the instructor. For Objective 1 the instructor did eight sample problems in front of the student with full explanation, assigned eight problems for Pam and Pat to complete for the next day, and reviewed the assigned problems with further explanation and clarification. For Objective 2, the same procedure was followed concurrently with Objective 1.

Baseline

During baseline Pam and Pat received each paper to complete during a maximum of 15 minutes. They could sit where they chose but were not allowed to receive help from the instructor, aide, or peers. No instructor contact other than handing out or receiving papers was carried out.

Contingency

During contingency the student followed baseline procedures with the addition of teacher praise and immediate correction. Pam and Pat were instructed to raise their hand to attract the instructor before going on to the next problem. The instructor responded by

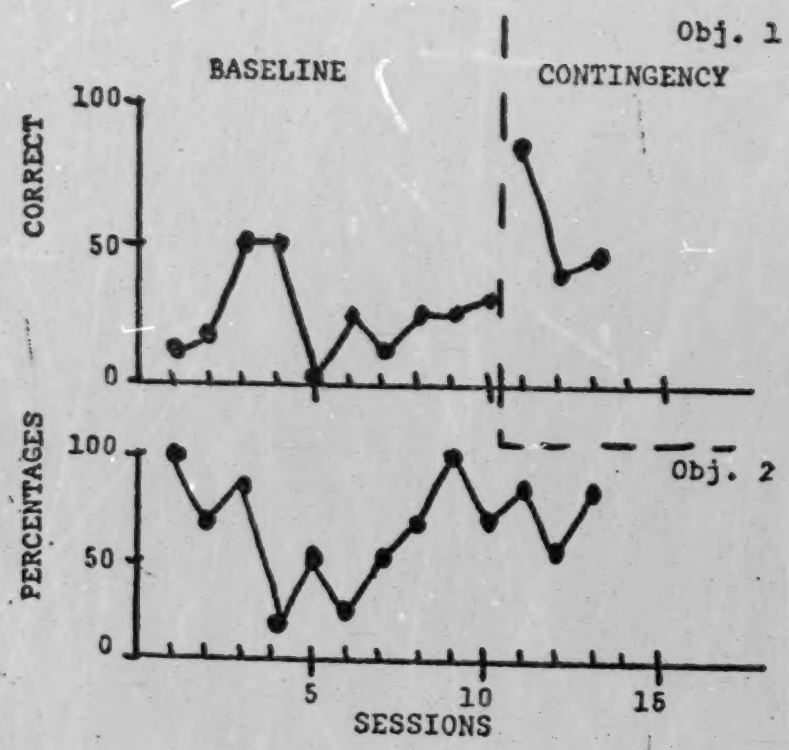

FIG. 1. Pam's percent correct on simple word problems (top graph) and multiplication and division of fractions (bottom) during each condition. On day 4, two problems with 3 factors were introduced.

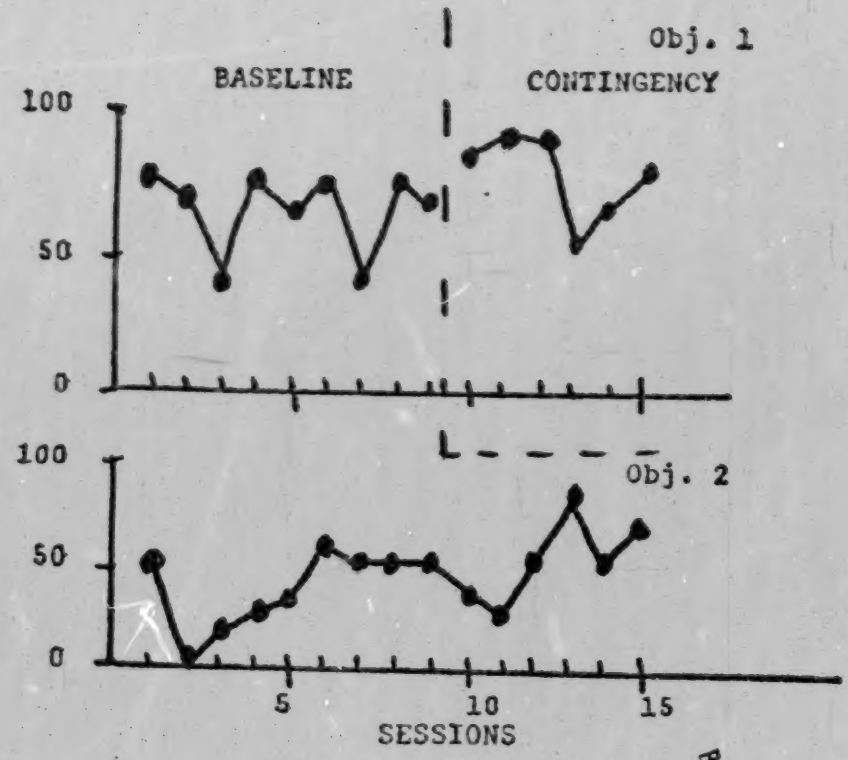

FIG. 2. Pat's percent correct on simple word problems (top graph) and multiplication and division of fractions during each condition.

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immediately correcting the problem at the student's desk. If the problem was correct a large "C" was placed next to the answer and praise was given. If the problem was incorrect a small "X" was placed next to the answer, the correct answer was written to the left of the incorrect answer, and no comment was made.

This was a multiple baseline study for both Pam and Pat with the contingency being applied to Objective 1 while continuing baseline conditions for Objective 2.

Results

The study is incomplete but partial data is listed in Tables 1 and 2. Figures 1 and 2 show graphs of per cent correct in each behavior for Pam and Pat respectively.

Discussion

The results at this time must be considered inconclusive as the study did not go to completion.

It should be noted that three of Pat's scores on Objective 1 during contingency were greater than any score during baseline (with one other score being equal to previous baseline maximum). In sessions 13 and 14, Pat departed from contingency rules somewhat as he raised his hand only after every three or four responses, thus reducing the number of possible contacts from the instructor. He returned to the stated contingency conditions at session #15.

In a measurement not directly connected with this study, the instructor measured each student's approach responses toward math class in September, January, and June. (This study took place in April-May.)

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The instructor-prepared inventory was merely a list of 36 pairs of freshman subjects (all possible combinations of 9 subjects taken two at a time) in which the student circled the subject he liked better of the two presented. The measure was per cent of times math was selected out of all possible times math could have been selected (8).

It is significant to note that both students doubled their previous (January) scores as shown in Table 1.

	Sept.	Jan.	June
Pam	25	25	50
Pat	25	37.5	75

TABLE 1. Percentage scores on math approach inventory for Pam and Pat.

The purpose of this study was to show that immediate knowledge of results and teacher praise could be effective behavior modifiers at the secondary school level. The study was incomplete and, as such, no conclusions can be drawn toward the hypothesis. The results of an indirect approach inventory, however, suggest that further efforts with these modifiers could show them to be effective.

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The Hinesburg Elementary School

by

Adler J. Muller

Hinesburg, Vermont, is a small rural community in the Champlain Valley with a population of less than 2,000. The central school, a K-8 organization, has 462 students, 51 of whom were in the 7th grade and 57 in the 8th grade during the 1972-73 school year.

The students in these grades follow a flexible semi-departmentalized schedule in language arts/social studies and math/science. Their program includes industrial arts, music, art, and physical education. Extra curricula offerings are inter- and intra-mural sports, cheer-leading, and monthly dances in the evening.

Of the five 7th and 8th grade teachers, two (language arts and math) were trained to provide special services under the Secondary Special Education Project during 1972-73. Another teacher (social studies) will begin training in the summer of 1973. The science, industrial arts, music, and physical education teachers will begin (or continue) training under the Consulting Teacher Program's K-6 project to develop minimum objectives.

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Improving Language Skills Through Antecedent and Consequential Events

by

Gary Delneo and Phyllis Paclucci

Introduction

Helping students acquire basic skills and knowledge required to successfully and happily function in our society has always been an educational goal. Various techniques, including the use of special schools, rooms, classes, incentives, and materials have been used.

A major assumption of behavior theory is that any behavior is a function of stimuli which precede (antecedent) and follow (consequential) the behavior.

Many studies have demonstrated the effectiveness of stimuli which follow language behaviors. Brigham, Graubard, and Stans (1972) showed that sequentially applied reinforcement contingencies greatly improved the composition writing of thirteen boys who were more than two years below grade level at the beginning of the study. Ayllon and Kelly (1972) found that both trainable retarded students as well as normal students scored significantly higher on standardized achievement tests under reinforcement conditions than they did under standard testing conditions. McKenzie, Clark, Wolf, Kothera, and Benson (1968) used a token system backed by privileges and allowances to increase academic performance. Broden, Hall, Dunlap, and Clark (1970) increased study behavior in a junior high special education class using a point system in which points were redeemable for privileges available in the class and school. They found that praise was effective but praise coupled with points seemed more effective at the junior high level. Kirby and Shields (1972) showed how an adjusting

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fixed-ratio schedule of praise and immediate correctness feedback produced increases in a seventh grade student's arithmetic response rate.

Very little work has been published concerning the effect of antecedent stimuli on classroom behaviors. Lovitt and Curtiss (1969) demonstrated that accurate arithmetic response rate was directly improved as a result of having the student verbalize the problem before writing answers.

The service projects for eligible students presented in this paper were designed to assess the effects of practice sheets (antecedent stimuli) and immediate knowledge of results (consequential stimuli) on the daily English grammar performance of two seventh grade students. A second purpose was to determine whether or not there would be a concurrent change in the monthly achievement scores as a result of improved daily performance.

Students and Setting

The students were a seventh grade boy and girl at an elementary school in a small, rural, Vermont town.

D was pleasant and generally cooperative, though not overly zealous, in his classroom work. He had a middle class background, was good in sports, and well liked by his peers. D was not a good reader. According to an SRA test (September, 1972) he had a fifth grade reading level and his total language arts scores reflected a fourth grade level of achievement.

C seemed exceptionally unmotivated. Her language arts teacher often had considerable difficulty in getting her to participate in class. Her parents were poor and Connie had only a small

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group of friends, most of whom were also poor, impolite, and difficult to work with. The larger section of the class treated her and her friends as outcasts and C and her friends would often fight among themselves. C was a poor reader as well as a poor math student. According to a September, 1972, SRA test she had a fourth grade reading equivalent while her total grade equivalent for both language arts and math was third grade.

The referral problem was that D and C had been scoring below grade level on a monthly achievement test of basic skills devised by their teacher.

The language arts class consisted of 25 pupils, each working on individualized assignments. The teacher's desk was against a wall at the front of the room. The pupils worked at desks and tables in groups of their own choosing. This heterogeneous class met in a large room which adjoined another room by an unscreened side doorway. There was a social studies class held in the adjoining classroom during this time.

D worked in the SRA Reading Lab IIIA and in an English program known as an Ace Kit 301. When available, a teacher aide worked with the students on the Ace Kit, reading assignments and correcting lessons. C worked in the SRA Reading Lab 1C, Action workbooks and in the Troubleshooter Series.

Method

Instructional Objective. The following instructional objective was derived by the teacher to enable D and C to achieve mastery of seventh grade language arts objectives.

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Conditions	Behavior	Criteria
Given daily assignments of five problems in each of two areas, based on the language arts achievement tests	the student will write the answers to the daily assignments	within 10 minutes and with 100% accuracy for two consecutive days in each area.

The areas were chosen from sections of the teacher-made achievement test on which the students had failed to meet the criteria of 80%. Students with the lowest inventory scores were chosen for the individualized instruction procedure described in this paper. Assignments were developed so that specific skills were presented in the order in which they appeared on the monthly test.

Measurement and Reliability Procedures

The measurement procedure was to count the number correct on each of the five question assignments. Assignments were generally given three times a week (Tuesday, Wednesday, and Friday) during third period at 11:30 a.m. A maximum of ten minutes was allowed for completion of the assignments. The assignments were multiple choice. (For examples, see Figure 1.) The correct answers were to be circled and no help was given by the teacher or other students.

An independent observer visited the classroom on several occasions to check for reliability of procedures (see Figure 2). The observer often acted as a second corrector for the assignments. Perfect agreement was reached as the teacher and observer compared corrections until 100% agreement was achieved.

Teaching/Learning Procedures

Baseline. During baseline the directions were read by the teacher but no questions were answered or assistance given. The

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teacher worked at his desk. Moreover, there was no feedback or knowledge of results given to any of the pupils.

Experimental Condition$_1$. The students were given a practice sheet (see Figure 3) and told that if they studied the sheet it would probably help them improve their language grades.

Experimental Condition$_2$. The students papers were corrected immediately following completion and they were told the number that they had correct.

Experimental Condition$_3$. C was told that she could earn 50¢ each time she achieved all five problems correct for a specific language area (first for Prefixes and then for Suffixes).

Results

In Suffixes D 's baseline performance ranged from 0 to 2 with an average score of 1.25. Following the introduction of practice sheets (Experimental Condition$_1$) his performance increased in range from 3 to 4 correct with an average of 3.25. Following knowledge of results (Experimental Condition$_2$), the next two assignments increased to 5 which meant Dan had met criteria for that skill.

An attempt was made to replicate this procedure for Pronouns. During the baseline condition, D 's number correct ranged from 1 to 4 with an average of 2.73. After the initiation of the practice sheet his range stabilized from 2 to 3 with an average of 2.75. After knowledge of results, D 's number correct ranged from 1 to 5 with an average of 3.66. D met criteria two days after the knowledge of results was given for Suffixes and six days after for Pronouns. (See Figure 4)

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In Prefixes, the practice sheet and knowledge of results failed to help C meet criteria. Her scores over the 21 sessions ranged from 0 to 3 with an average of just over 1. Figure 5 shows Connie's performance over the last 8 days under a combination of $Baseline_1$, $Condition_1$, and $Condition_2$. Then C was told that she could earn fifth cents ($Experimental\ Condition_3$) for each perfect assignment she turned in. Her fourth assignment following this notice was a five and the following one was as well. She had met criteria!

In Suffixes during baseline, C 's scores ranged from 1 to 3 with an average of 1.75. In this case, there was a variation in procedure. Before she was given a sheet or knowledge of results, C was told that she could earn fifth cents in this area for a perfect paper. Her next assignment was a 3. Before the following assignment a proactice sheet was given to C and knowledge of results followed the remaining assignments. It took C six assignments before she reached criteria but under this condition her score never dropped below 4.

Discussion

It never became necessary to give D any additional reward for his performance. It was noticed that his behavior concerning the number correct of language assignments began to stabilize immediately following the initiation of the practice sheet for both Suffixes and Pronouns but did not meet criteria until the initiation of the knowledge of results.

A further result was noticed in D 's Monthly Achievement scores (see Figure 6). His October score was 58%. His April inventory increased to 74%. He had met criteria in two of the first four areas of that test from which the daily assignments had been drawn.

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D 's behavior was then, in a sense, shaped in that by increasing proficiency in specific areas one at a time he began to achieve improved scores on the entire language test.

The procedure of developing specific materials for given areas of language, paired with immediate correction and knowledge of results proved helpful to this seventh grade boy.

The initial objective was to increase C 's Monthly Achievement scores. (See Figure 7) Her October score was 20%. Of the first four areas of the test (plurals, prefixes, suffixes, and pronoun usage), C met criteria (80%) in plurals alone. Following the program which included assignments in precisely these areas, C scored a 48% on her April test and, though criteria for the test as a whole was not met, it was met in every area in which daily assignments were given.

Although three procedures (a practice sheet, immediate knowledge of results and money) were used to help this seventh grade girl improve her language skills, there was no definite change in the number correct until the chance of earning money was initiated. It was apparent that for this deprived student, learning for "learning's sake" had not become a conditioned reinforcer. However, after the chance of earning money was presented, she started asking for help from her peers and as a "thank you" to them for helping her, she shared her reward with them (by treating them to ice cream, etc. at a snack bar near the school). As C began to show an interest in school, asking for and receiving help and pairing herself with learning as well as with "treats" her circle of "friends" increased as did her smiles and over-all attitude toward herself and school. The total cost for her reinforcers was $3.00.

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DAILY QUIZ-PREFIXES-FORM IA

NAME_____ DATE_____

DIRECTIONS:

BELOW ARE 5 PREFIXES WITH FOUR POSSIBLE DEFINITIONS. CIRCLE THE LETTER OF THE DEFINITION WHICH BEST DESCRIBES THAT PREFIX.

1.	EX-	A. OVER	B. NEVER	C. INTO	D. OUT OF
2.	AUTO-	A. MOVING	B. FAST	C. SELF	D. ALWAYS
3.	MONO-	A. ONE	B. SICKNESS	C. LAZY	D. MANY
4.	HYDRO-	A. FIRE	B. WATER	C. HIGH	D. UNDER
5.	MAL-	A. SLOW	B. SOFT	C. HARD	D. BAD

DAILY QUIZ-PREFIXES-FORM IB

NAME_____ DATE_____

DIRECTIONS:

BELOW ARE 5 PREFIXES WITH FOUR POSSIBLE DEFINITIONS. CIRCLE THE LETTER OF THE DEFINITION WHICH BEST DESCRIBES THAT PREFIX.

1.	ANTI-	A. AGAINST	B. AUNT	C. BETWEEN	D. INSECT
2.	CIRCUM-	A. STAND	B. AROUND	C. NEAR	D. NOT
3.	PAN-	A. ALL	B. BOY	C. YOUNG	D. CLOTHES
4.	DIS-	A. VERY	B. FIND	C. NOT	D. UNTIL
5.	TELE-	A. AT A DISTANCE	B. PHONE	C. SEE	D. BEFORE

DAILY QUIZ-PREFIXES-FORM IC

NAME_____ DATE_____

DIRECTIONS:

BELOW ARE 5 PREFIXES WITH FOUR POSSIBLE DEFINITIONS. CIRCLE THE LETTER OF THE DEFINITION WHICH BEST DESCRIBES THAT PREFIX.

1.	PRE-	A. BEST	B. BEFORE	C. NICE	D. LAST
2.	TRI-	A. THREE	B. TRYING	C. PULL	D. STRONG
3.	INTRA-	A. WITHIN	B. BETWEEN	C. IN THREE	D. INTEREST
4.	OB-	A. OLD	B. FAT	C. AGAINST	D. SMELLY
5.	BI-	A. UNDER	B. OVER	C. BUY	D. TWO

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Teacher Gary Delneo Observer

School Hinesburg Gr. 7 Class

Date Time: 10:45 - 11:55

Tues. - Wed. - Fri.

O. T.	Objective		
	Conditions	Behavior	Criteria
	Given daily assignments of 5 problems in each of 2 areas, based on the Monthly Achievement skills (all students scoring below 80% in specified areas)	the student(s) will write the answers to the daily assignments	until they score 100% for two consecutive days in those areas.

O. T.

Assignments will be developed so that specific skills will be presented in the order that they appear on the Monthly Achievement Tests.

Teacher directions - Read the directions on your paper(s). You have 5 minutes to complete each paper. There will be no questions or help given during this time. Turn your papers over when they are completed. Do your best.

Start Time Start Time

Finish Time Finish Time

Consequences -

Figure 3

PREFIX PRACTICE SHEET (I)

NAME_____ DATE_____

WORD	DEFINITION	EXAMPLE
MAL	BAD	MALCONTENT
ANTE	BEFORE	ANTEDATE
ANTI	AGAINST	ANTIDATE
UN	NOT	UNFAIR
IN	INSIDE	INFLOW
IN	NOT	INCOMPLETE
DIS	NOT	DISTASTEFUL
HYDRO	WATER	HYDRANT
PAN	ALL	PANACEA
EX	OUT OF	EXTERNAL
SUPER	ABOVE, GREATER	SUPERMARKET
CIRCUM	AROUND	CIRCUMNAVIGATE
TELE	AT A DISTANCE	TELEPHONE
INTER	BETWEEN, AMONT	INTERSTATE
INTRA	WITHIN	INTRAMURALS
IM	NOT	IMPOSSIBLE
PRE	BEFORE	PREVIEW
TRANS	ACROSS	TRANSOCEANIC
POST	AFTER	POST SCRIPT
RE	AGAIN	RETURN
SUB	UNDER	SUBWAY
UTO	SELF	AUTOMOBILE
BI	TWO	BICYCLE
TRI	THREE	TRICYCLE
OB	AGAINST	OBSTINATE

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D.

FIG. 4

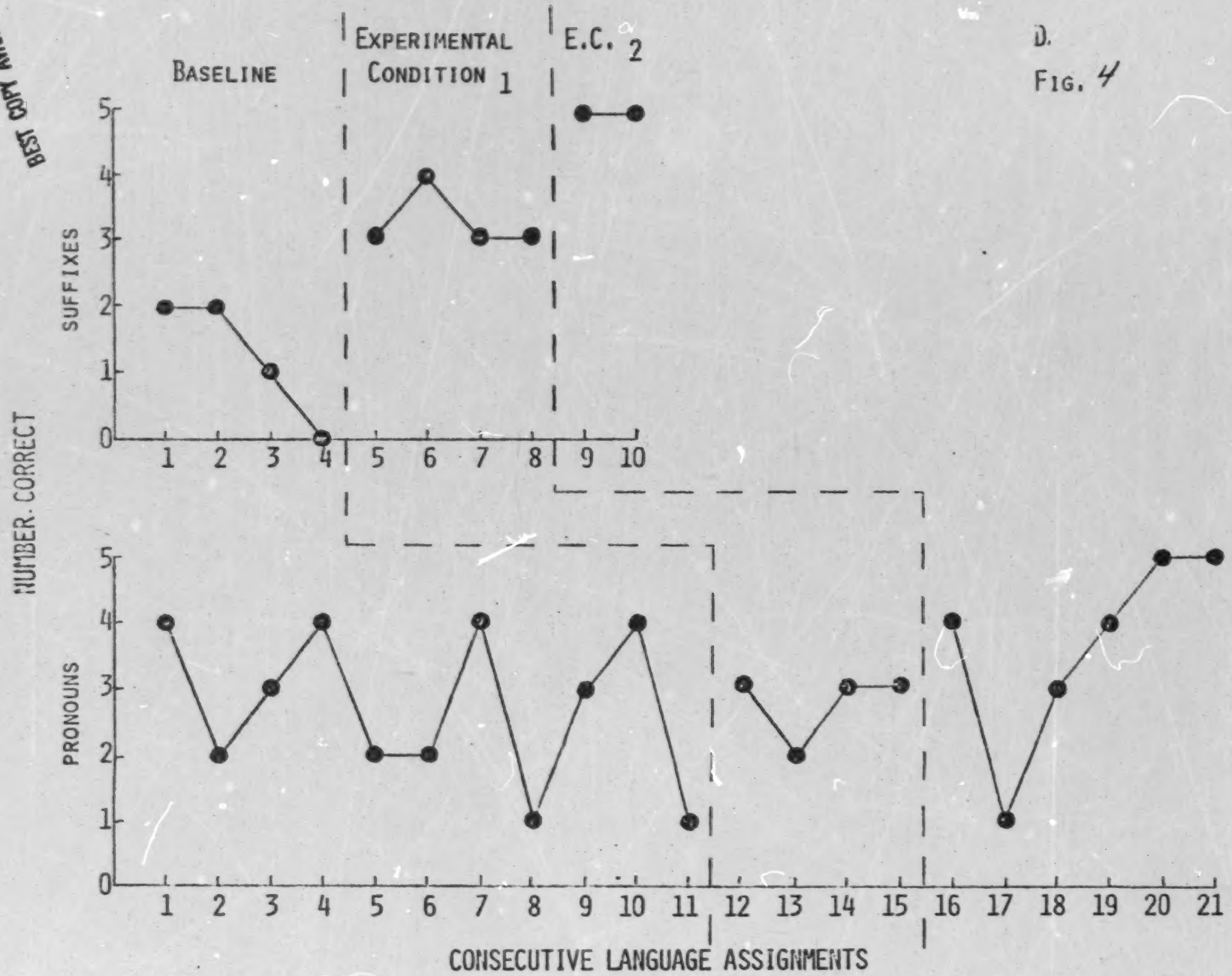

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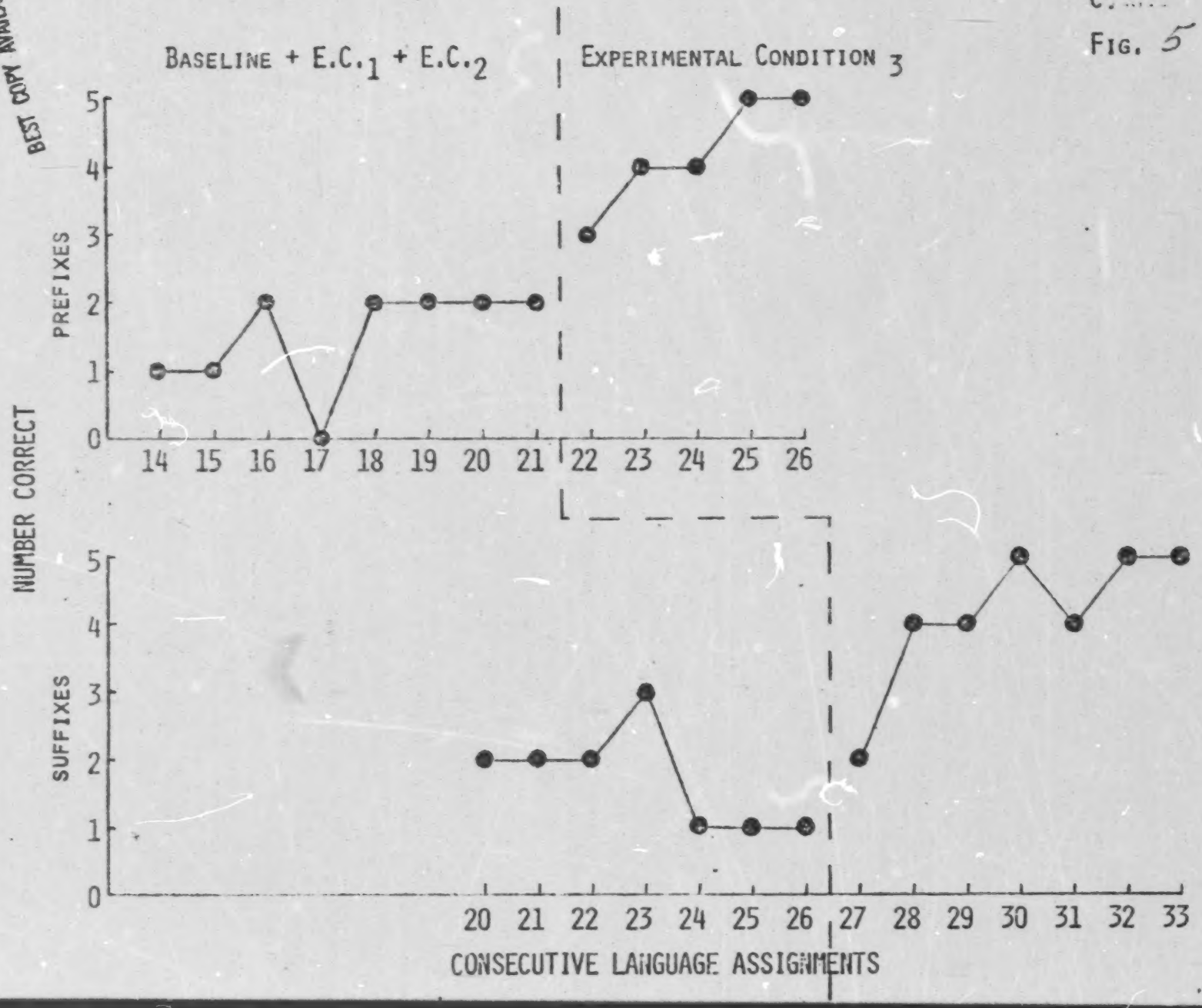
FIG. 5



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Grades as Tokens with the Chance to Earn a Trip for Increasing Math Accuracy

by

Robert Nicolino and Phyllis Paolucci

Introduction

Reinforcement procedures have been utilized in many cases to help improve the academic and/or social behaviors of school children eligible for special education. Hasazi and Hasazi (1972) demonstrated the effects of teacher attention in modifying the digit-reversal behavior of an elementary school child with learning disabilities. Kirby and Shields (1972) showed how an adjusting fixed-ratio schedule of praise and immediate correctness feedback produced increases in seventh grade student's arithmetic response rate. Bushell, Wrobel, and Michaelis (1968) modified study behavior utilizing a token system and group contingencies. Walker and Buckley (1968) improved attending behavior by providing points for increasing intervals of attending behavior. The points could be exchanged for a model of choice at the end of the treatment period. Accurate academic response rate was directly improved by Lovitt and Curtiss (1968, 1969) as a result of verbalizing the problem before writing correct answers and of self-imposed as opposed to teacher-imposed reinforcement contingencies. McNeil, Hasazi, Muller, and Knight (1972) used the following contingencies: points, principal conferences, cards sent home, self-recording, and trips of the students' choice to modify such school behaviors as minutes spent on non-academic tasks, percent correct responses, verbal aggressions, per cent complete of academic and daily tasks, and participation on assignments during class time.

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Kessler (1966) estimated that three-fourths of all elementary school age students are referred for individual study and treatment because of academic behavior problems. In Vermont it is estimated that 80 per cent (McKenzie, Egner, Knight, Perelman, Schneider, and Garvin, 1970) of the children eligible for special education services are in regular classes.

The service projects for eligible students presented in this paper were designed to measure the effects of grades as tokens with inexpensive back-ups on increasing the math performance of junior high school students. A second purpose of these projects was to determine whether or not there would be any generalization on the monthly achievement test as a result of improved daily work.

Students and Setting

The students were two thirteen year old seventh grade girls at an elementary school in a small, rural, Vermont town.

K was orphaned at the age of three and had had family problems throughout her school days. She was a very immature student and did not have many friends at school.

Her most recent standardized test scores for mathematics (SRA in September, 1972) indicated a 3.8 grade level in concepts, a 4.5 grade level in computation and an overall math grade level of 4.2.

(lived with her mother and stepfather, and besides being a low academic achiever in math, seemed to have many problems at home which affected her work at school.

Her most recent standardized test scores (SRA in September, 1972) for math indicated a 5.3 grade level in concepts, a 5.7 grade level in computation, and an overall math grade level of 5.6.

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Both students were working well below the minimum objective for their math class and were especially weak in the area of division of whole numbers.

K and C were members of a seventh grade math class of 27 students. All material was individualized and students could choose a seat within a certain area of the room.

Instructional Objective

Conditions	Behavior	Criteria
Given 12 problems in the area of division of whole numbers	the student will write the answers to the problems	with at least 80% correct within the class period (60 minutes) for two consecutive days.

Method

Measurement Procedures

The percent correct on the daily worksheets containing 12 division problems was determined by dividing the number correct by 12 and multiplying by 100. The worksheets contained from 1 to 3 digit divisors and from 1 to 6 digit dividends. There were four forms of the division worksheets (A, B, C, and D - see Figure 1). The assignments were given four days a week; Monday, Tuesday, Thursday, and Friday, from 12:55 to 1:50 during the regular math class. The students were not given any help, nor were they allowed to ask questions.

Reliability Procedures

An independent observer visited the classroom on several occasions to check for reliability of procedures (see Figure 2). The

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observer often acted as a second corrector for the assignments. Perfect agreement was reached as the teacher and observer compared corrections until 100% agreement was achieved.

Teaching/Learning Procedure

During baseline 1, the students were given the daily worksheet, told to do their best, and that if they scored 80% or better on two successive days they would be able to move on to a new area of math.

When they finished the worksheet they placed it in a box and continued with their other math work. The corrected papers were returned to them the following day.

During experimental condition 1, K and C were told that if they scored 80% or better on two successive days, they would be taken on a trip of their choice (to a pet shop and to lunch).

During baseline 2, they were told that due to transportation and other problems there would not be any trip. During experimental condition 2, they were told that the transportation and other problems had been ironed out and that it would again be possible for them to earn the trip.

Results

An ABAB design was used to evaluate the effectiveness of the intervention procedure.

During baseline 1, K 's percent correct ranged from 25 to 58. This period continued for five days and her percent correct averaged 36.

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Experimental condition 1 covered four days with a range of 58% to 92% correct. K averaged 75% during this phase.

Baseline 2 was four days with a range of 50% to 58%. She averaged 54% correct during this phase.

Experimental condition 2 extended three days with a range of 67% to 92% and an average of 84% (see Figure 3).

During baseline 1, C 's percent correct ranged from 0 to 33. This period extended for ten days with an average percent correct of 23.

Experimental condition 1 took four days with a range of 33% to 67% correct. Her average percent correct during this period was 46.

Baseline 2 extended for three days. Her scores for each day were 41%, 41%, and 33%. She averaged 38% during this phase.

Experimental condition 2 lasted five days. She scored 50% on the first day of this phase and then increased to 75% correct on each of the four remaining days. Her average for this period was 70% (see Figure 4).

Discussion

The results of this study clearly show that K had developed the skills to perform the division worksheets at, or above, an 80% level. However, she only demonstrated these skills when there was a chance of earning a trip. It was obvious to the classroom teacher that during the experimental conditions K "tried" much harder on the worksheets than she did during the baseline conditions. During the baseline conditions she completed her paper sooner and often asked to go to the bathroom during class time. In the experimental

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conditions, she never asked to go to the bathroom, and spent more time on the worksheets.

It was apparent that for K , "learning for learning's sake" had not become a conditioned reinforcer. Therefore, the trip was used as a means of helping her acquire a basic math skill.

This teacher plans to use a variety of potential reinforcers (immediate correction, praise, free time, etc.) to increase K 's performance in other areas. It is hoped that with the pairing of rewards with school work that "learning for learning's sake" will become a reality for K .

Even though C did not meet the criteria of 83% or better during the study, she did improve greatly. One can speculate as to why C did not meet the criteria on daily assignments since she seemed to have the necessary skills. It is possible that the reward was not strong enough for her, even though she did improve during the experimental conditions. Whatever the reasons, (did improve in the area of division of whole numbers on her monthly achievement test and this was the major measure for student progress used in her math class.

EXHIBIT A

DATE _____ STARTING TIME _____

COMPLETION TIME _____

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1) 7) 336	2) 46) 1242	3) 26) 312	4) 31) 7440
5) 25) 675	6) 74) 2664	7) 27) 5562	8) 28) 7112
9) 46) 14.996	10) 643) 18.004	11) 423) 50.006	12) 642) 193.574

173

FIGURE 2

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Teacher _____ Observer _____

School _____ Gr. 7 Class _____

Date _____ Time: 1:50 - 2:50

Mon. - Tues. - Thurs. - Fri.

O. T. Teacher directions - Do the best you can on the 12 problems that I give you today. When you finish, put your paper in the box and work on your other assignment.

O. T. Consequences - After receiving above 80% on two successive days a student will move on to the next area.

O. T. Kind of problems -

O. T. Number of problems - Each student is required to complete 12 problems each day.

Students

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____

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K.

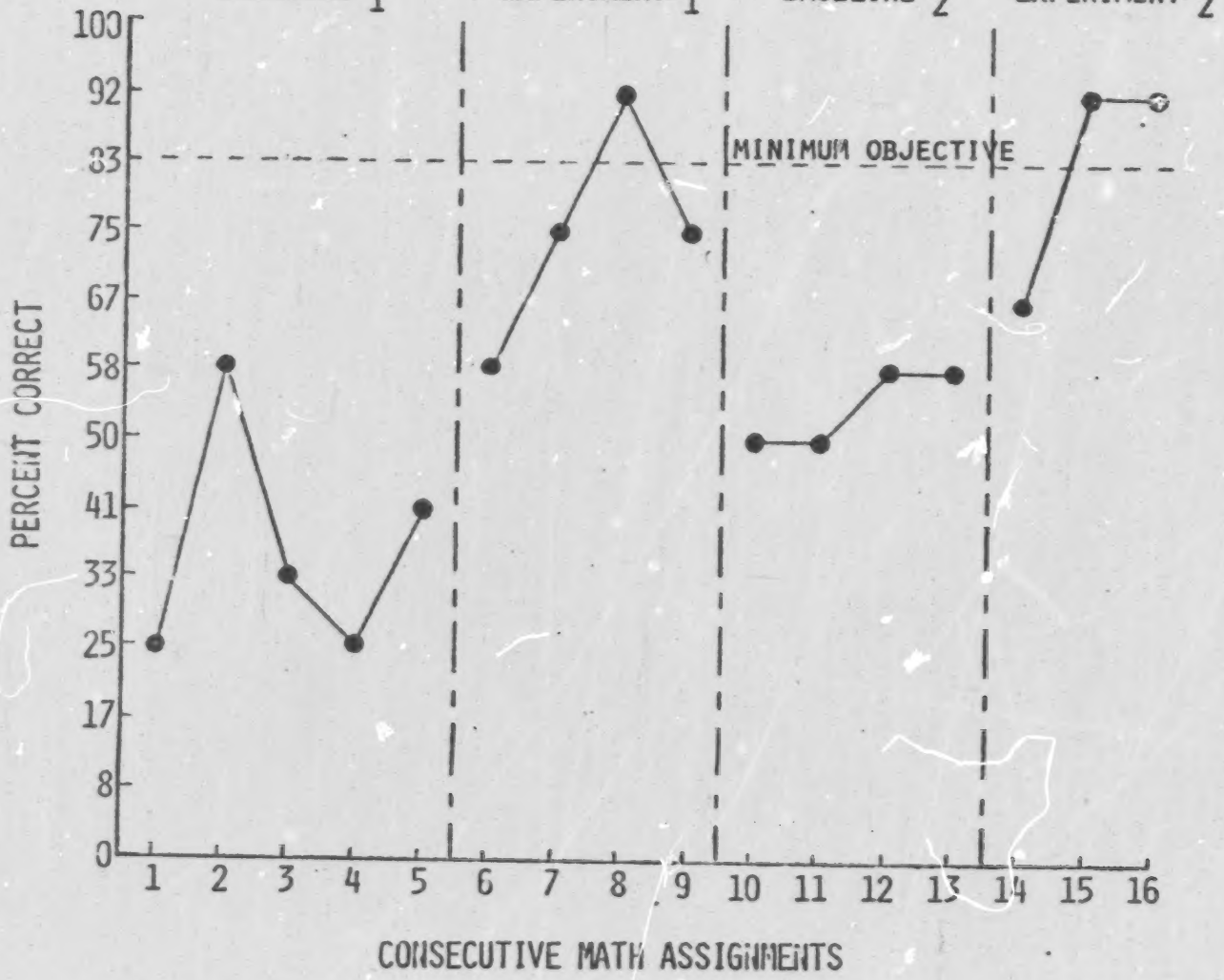

FIG. 3

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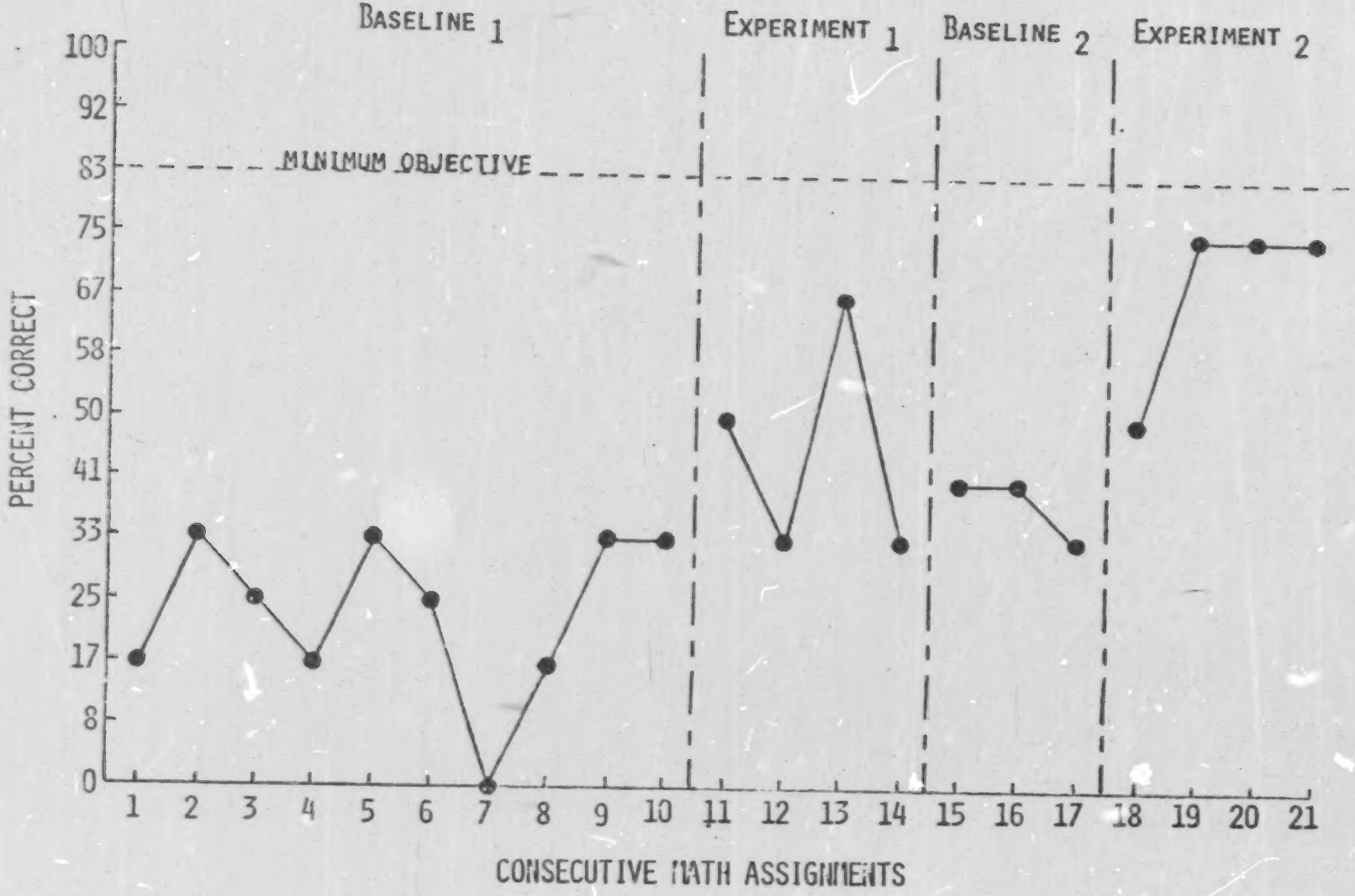

FIG. 4

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The Effects of a Three Step Procedure on Accuracy of Division Problems for a Seventh Grade Boy

by

Catherine Homan, Ann Egner, and Phyllis Paolucci

Response rate and accuracy in academic subjects is something most teachers desire. Many teachers have recently rearranged consequences to improve certain academic behaviors in children. McKenzie, Clark, Wolf, Kothera, and Benson (1968) showed that grades could be improved when parents arranged daily allowances contingent upon academic behaviors. Conlon, Hall, and Hanley (1972) demonstrated that a peer who used immediate feedback of big "C's" plus a bar graph filled in by the student was effective in improving response accuracy for arithmetic. Verbal praise has also been found to increase desirable positive arithmetic responses as shown in the study by Fresn (1970).

The use of peers as tutors or correctors (Conlon, et al., 1972, and Burdett, 1969) has indicated that peers may be an effective learning resource for teachers. This study attempted to replicate the effects of the three step teaching model described by McNeil, Hasazi, Muller, and Knight (1972). First, the teacher or peer tutor does the problem as a model while the student watches. Then the student does the problem with help from the teacher. Finally, the student completes a similar problem independently with immediate feedback.

Method

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Student and Setting

Robby was a friendly, quiet eighth grade boy. He had repeated the 5th grade. According to school records, he had always been a "slow learner." Robby's eighth grade math class of about 20 boys met daily. The teacher had designed for each student an individualized program with worksheets and tests. The teacher gave all the students tests at various intervals and recorded the results on a graph kept by the pupil and teacher. Intermittent teacher praise for academic and social behavior was used in the classroom.

Robby was working two years or more below the eighth grade level in mathematics. His teacher reported that Robby seemed to understand the basic division facts but had trouble dividing even with one digit divisors.

Robby was taken into the library to be tutored. This was a large room with the librarian present. Sometimes when children were in the library, Robby and his tutor worked in a small room off the library.

Entry Level Measurement and Results

Robby was given two entry level tests consisting of 20 division problems with mixed problems from one divisor up to three divisors with and without remainders. (See Figure 1) They also had mixed dividends from two numerals up to five numerals. Robby scored 30% and 45% respectively on these tests. Also, it was seen from the tests that Robby required instruction in both placement and checking.

Entry level tests were given at the start of each new division concept to be certain that Robby was deficit in that step to be taught. (See Figure 2)

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Instructional Objective

Given twenty division problems involving whole numbers and from one to three divisors and from two to five dividends, with or without remainders, Robby will divide and write the answers to the problems with at least 90% accuracy within thirty minutes for at least two consecutive assignments.

Daily Measurement Procedures

At the end of each tutoring session after Robby had completed his assignment, the paper was corrected by putting big red "C's" on the correct problems. Reliability was obtained by a second observer who independently checked the paper. The reliability was 100% for all papers observed. A daily percentage correct was computed by dividing the total number correct by the total number assigned and multiplying by 100.

Reliability of procedures was obtained by a second observer who used a check list to determine that all steps described in the teaching procedures were implemented. Reliability was obtained for both conditions and was 100%.

Teaching/Learning Procedures

Entry Level Condition: The tutor gave the tests to the student and explained it. Then the tutor recorded the time at the beginning of the test, and the student started the test. The student received no help from the tutor. At the end of thirty minutes, the student stopped the test and the tutor checked it and recorded the results on a graph.

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Three Step Condition: First the tutor did the problem explaining the process while Robby watched. Then Robby did a problem with help from the tutor, and finally, Robby did a problem independently and it was checked immediately by the tutor. The rest of the assignment was then given and checked after completion.

When the student received 90% or more for two consecutive assignments, an entry level for the next step was given. Whenever Robby received 90% or more, he was given a red pen to fill in his own bar graph and also received verbal praise. If his mark was below 90%, he had to return the pen to the tutor until he scored above 90% again.

The first concept was the correct placement of the numerals in the quotient. The second concept was to check completed division problems by multiplying. The remaining concepts included problems with more than one divisor until the terminal objective was met. Worksheets for each concept were prepared by taking samples of problems from different sources as shown on the sample in Figure 5.

The following sources were used: The Programmed Math Book 5, Division, a Sullivan Associates Program from McGraw-Hill Book Company; Elementary School Mathematics, supplementary practice, Addison-Wesley Publishing Co.; Division, Step II, Materials from the Consulting Teacher Program.

Tutor Training Procedures

When the student had demonstrated mastery of the process of division, the adult tutor then trained a peer tutor to continue the teaching/learning procedures.

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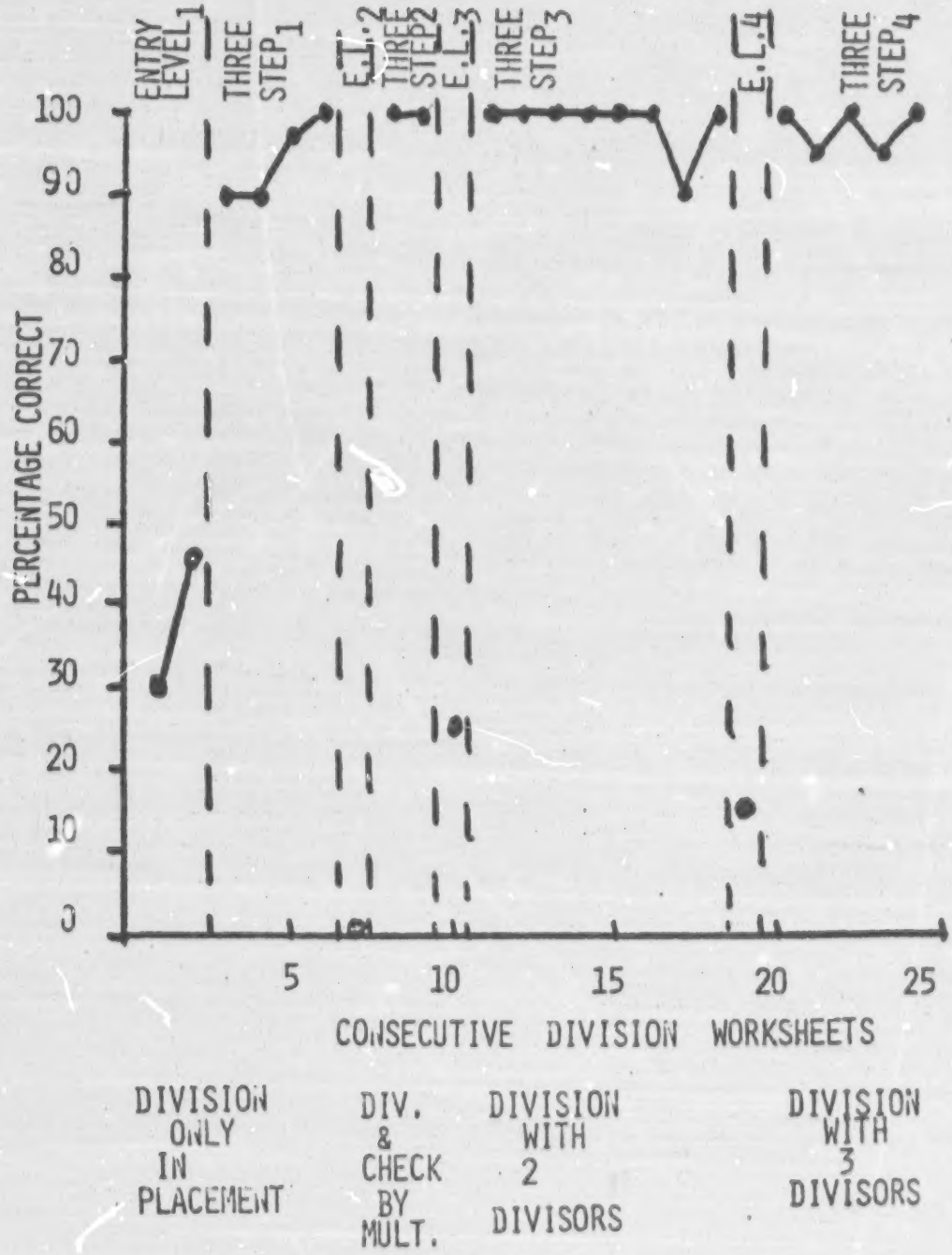

FIG. ROBBY'S ACCURACY ON DIVISION WORKSHEETS DURING ENTRY LEVEL CONDITIONS AND THREE STEP CONDITION. ON DAY 13 , A PEER TUTOR BEGAN THE PROCEDURES

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This was done by using the reliability measures checklist for the Entry Level Condition and the Three Step Condition. The adult tutor first demonstrated the correct procedures, then the peer tutor worked with the student with immediate feedback from the adult tutor. Lastly, the peer tutor followed the procedure independently. The peer tutor continued to use the checklist as a guideline.

Results

Figure 6 depicts Robby's accuracy on worksheets for each condition. The results showed that during entry level conditions, the scores ranged from 30-40% correct answers to the problems with a mean of 38% for the two tests. During the Three Step Condition, performance formance improved to a range of 90% to 100% with a mean of 94%.

On Entry Level$_2$, there was only one test on the checking of division and the student received 0%. During Three Step Condition$_2$, the student scored 100% correct on both papers.

On Entry Level$_3$, (division with two divisors), the student scored 25%. During Three Step Condition$_3$, Robby's mean score was 99%.

On Entry Level$_4$, (division with three divisors), Robby scored 15% correct. During Three Step Condition$_4$, the range increased to 95-100% with a mean of 98%.

Discussion

The use of big red "C's" in correcting student's work in itself has been effective, but in order to bring Robby to an acceptable level quickly, the "C's" plus the other variables were used.

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This "package deal" did accelerate the learning to a high level.

The teacher reported that Robby seemed much happier and was working diligently not only in math, but in other subjects as well.

Time_____

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Entry Level Test I

Name_____ Date_____

Observer_____ Score_____

1.	$9\overline{)0}$	$1\overline{)5}$	$2\overline{)14}$	$9\overline{)28}$
2.	$4\overline{)164}$	$4\overline{)395}$	$9\overline{)5229}$	$6\overline{)2913}$
3.	$3\overline{)9363}$	$4\overline{)12,484}$	$5\overline{)36,003}$	$7\overline{)10,106}$
4.	$48\overline{)446}$	$50\overline{)3250}$	$54\overline{)2068}$	$68\overline{)37,340}$
5	$86\overline{)46,096}$	$619\overline{)13,618}$	$694\overline{)31,646}$	$841\overline{)37,002}$

Figure 1

Time_____

Entry Level Test - 2 divisors

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Name_____ Date_____

Observer_____ Score_____

1.	13/ 78	14/ 98	12/ 65	15/ 95
2.	24/ 312	37/ 962	12/ 586	23/ 550
3.	27/ 3564	74/ 7252	36/ 2026	34/ 3830
4.	16/ 768	52/ 2724	18/ 310	14/ 56
5.	34/ 4284	53/ 2120	26/ 96,423	11/ 41,844

Figure 2

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Reliability of Procedures

Condition A: Entry Levels

1. Explain Test ☐
2. Administer Test ☐
3. Record time at beginning ☐ at end ☐
4. Tutor checks test ☐

Condition B: Instruction, Bar Graph Red Pen, Verbal Praise

1. Give assignment ☑
2. Go through three step model ☑
3. Record time at beginning ☑ at end ☑
4. Tutor checks paper ☑
5. Student fills in bar graph ☑

James A. Burns

Figure 3

Jan. 17, 1973

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Reliability of Procedures

Condition A: Entry Levels

1. Explain Test
2. Administer Test
3. Record time at beginning at end
4. Tutor checks test

Condition B: Instruction, Bar Graph Red Pen, Verbal Praise

1. Give assignment
2. Go through three step model
3. Record time at beginning at end
4. Tutor checks paper
5. Student fills in bar graph

Jim Burns

Figure 4

Time_____

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I = 2 Divisors, 2 Dividends

Name_____ Date_____

Observer_____ Score_____

1.	23/ 71	41/ 83	19/ 79	25/ 79
2.	14/ 89	18/ 75	22/ 68	16/ 63
3.	14/ 45	19/ 98	14/ 87	22/ 91
4.	32/ 98	44/ 90	13/ 82	26/ 80
5.	21/ 87	15/ 79	19/ 79	28/ 57

Figure 5

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